Q1 y ORDER NO. DAD84030070C9

Service Manual

Quartz Direct Drive Automatic Turntable System

SL-QL5/(K)

[E], [EK], [XL], [EG], [EB], [EH], [EF], [Ei], [EC], [XA], [XM], [PA], [PE], [PC]

Areas

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EG] is available in F.R. Germany.
* [EB] is available in Belgium.
* [EH] is available in Holland.
* [EF] is available in France.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.
* [PA] is available in far East PX.
* [PE] is available in European Military.
* [PC] is available in European Audio Club.

T4P is the standard mark for the "P-mount" plug-in-connector system. Products carrying this mark are inter-changeable and compatible with each other.

***The colors of this model include silver and black.**
***The black type model is provided with (K) in the Service Manual.**

Please use this manual together with the service manual for Model No. SL-QL5, Order No. DAD84030069C1.

English

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply:	For United Kingdom: 240 V AC, 50 Hz For continental Europe: 220 V AC, 50 Hz For others: 110-120/220-240 V, 50 or 60 Hz
Power consumption:	10 W
Dimensions: (W×H×D)	43 × 8.8 × 35 cm (16-59/64" × 3-1/2" × 13-25/32") 43 × 38.5 × 35 cm 16-59/64" × 15-23/64" × 13-25/32" (Maximum height when dust cover is open.)
Weight:	5.1 kg (11.2 lb.)

■ Turntable section

Type:	Direct drive Fully Automatic turntable Auto start/Auto lead-in Auto return Auto stop Repeat play Auto speed select Manual speed selection possible Auto size select Record presence detection
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	Quartz-phase-locked control
Turntable platter:	Aluminum die-cast Diameter 30 cm (12")
Turntable speeds:	33-1/3 rpm and 45 rpm Auto speed select (Manual seletion possible)
Wow and flutter:	0.012% WRMS* 0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A Weighted)
	* Measured by obtaining signal from built-in frequency generator of motor assembly.
Rumble:	−56 dB (IEC 98A Unweighted) −78 dB (IEC 98A Weighted)

■ Tonearm section

Type:	Dynamic balanced type Linear tracking tonearm 4-pivot gimbal suspension
Effective length:	10.5 cm (4-1/8")
Tracking error angle:	Within ±0.1°
Effective mass:	9 g (including cartridge)
Resonance frequency:	12 Hz

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

Tonearm drive motor: DC motor
Phono cable capacitance: 150 pF

■ Cartridge section

Type: Moving magnet stereo cartridge
EPC-P28S (For [PA], [PE] and [PC] areas)
EPC-P30S (For others)
Magnet circuit: All laminated core
Frequency response 10 Hz~40 kHz
20 Hz~10 kHz ±1 dB
Output voltage: 2.5 mV at 1kHz, 5 cm/s. zero to peak lateral velocity (7 mV at 1kH, 10 cm/s. zero to peak 45° velocity [DIN 45 500])
Channel separation: 22 dB at 1 kHz
Channel balance: Within 1.8 dB at 1 kHz
Recommended load impedance: 47 kΩ~100 kΩ
Compliance (dynamic): 12×10^{-6} cm/dyne at 100 Hz
Stylus pressure range: 1.25 ± 0.25 g (12.5 ± 2.5 mN)
Weight: 6 g (cartridge only)
Replacement stylus: EPS-28ES (For [PA], [PE] and [PC] areas)
EPS-30ES (For others)
(Elliptical stylus)

- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
  - ★ 220V (50/60 Hz) for Continental Europe.
  - ★ 240V (50/60 Hz) for United Kingdom and Australia.
  - ★ 110V-120V/220V-240V (50/60 Hz) for other areas.
  - ★ [EK], [XA], [XM], [PA], [PE] and [PC] areas are provided with voltage selector.

Deutsch

TECHNISCHE DATEN

Änderungen der technischen Daten vorbehalten.
Die angegebenen Gewichts- und Abmessungsdaten sind circa Werte.

■ Allgemeine Daten

Stromversorgung: ~220V, 50 Hz Wechselstrom
Leistungsaufnahme: 10 W
Abmessungen: 43 × 8,8 × 35 cm
(B×H×T) 43 × 38,5 × 35 cm Maximale Höhe bei vollständig geöffnetem Gehäuseoberteil)
Gewicht: 5,1 kg

■ Plattenspieler

Typ: Direktangetriebener automatischer Plattenspieler
Auto-Start/Auto-Zuführung
Rückführautomatik
Stopp-Automatik
Wiederhol-Betrieb
Automatische Drehzahlwahl
Manuelle Drehzahlwahl möglich
Automatische Plattengrößewahl
Plattenpräsenz-Registrierung
Antrieb: Direktantrieb
Motor: Kollektorloser Gleichstrommotor
Antriebsregel-Methode: Quarz-Steuerung QPL
Plattenteller: Aluminium-Druckguß Durchmesser 30 cm
Plattenteller-Drehzahlen: 33-1/3 und 45 U/min
Automatische Drehzahlwahl (manuelle Wahl möglich)
Gleichlaufschwankungen: 0,012% WRMS*
0,025% WRMS (JIS C5521)
±0,035% Spitze (IEC 98A bewertet)

* Gemessen anhand von Signalen vom eingebauten Frequenzgenerator des Motorbauteils.

Rumpel-Fremdspannungsabstand: −56 dB (IEC 98A unbewertet)
Rumpel-Geräuschspannungsabstand: −78 dB (IEC 98A bewertet)

■ Tonarm

Typ: Dynamisch ausbalancierter Tangential-Tonarm mit Kardanaufhängung mit 4-Punkt-Drehlager
Effektive Länge: 10,5 cm
Spurfehlwinkel: Innerhalb ±0,1°
Effektive Masse: 9 g (einschließlich Tonabnehmer)
Resonanzfrequenz: 12 Hz
Tonarm-Antriebsmotor: Gleichstrommotor
Phonokabel-Kapazität: 150 pF

■ Tonabnehmer

Typ: Stereo-Magnet-Tonabnehmer mit
Magnetkreis: Ganzlamellenkern
Frequenzgang: 10 Hz bis 40 kHz
20 Hz bis 10 kHz ±1 dB
Ausgangsspannung: 2,5 mV bei 1 kHz
5 cm/s. Null-zu-Spitze, lateral
[7 mV bei 1 kHz 10 cm/s. Null-zu-Spitze, 45° (DIN 45 500)]
Kanaltrennung: 22 dB bei 1 kHz
Kanalabweichung: Innerhalb 1,8 dB bei 1 kHz
Empfohlene Endimpedanz: 47 kΩ ~ 100 kΩ
Nachgiebigkeit (dynamisch): 12×10^{-6} cm/dyn bei 100 Hz
Auflagekraft-Einstellbereich: 1,25 ±0,25 g (12,5 ±2,5 mN)
Gewicht: 6 g (nur Tonabnehmer)
Ersatznadel: EPS-30ES
(Elliptische Nadel)

Français

CARACTERISTIQUES

Les spécifications sont susceptibles d'être modifiées sans préavis.
Le poids et les dimensions donnés sont approximatifs.

■ Généralités

Alimentation: 220V C.A., 50 Hz
Consommation: 10 W
Dimensions: 43 × 8,8 × 35 cm
(L×H×P) 43 × 38,5 × 35 cm
(Hauteur maximum lorsque le couvercle protègepoussière est oúvert.)
Poids: 5,1 kg

■ Platine de lecture

Type: Entraînement direct
Platine entièrement automatique
Départ automatique/Entrée automatique
Retour automatique
Arrêt automatique
Auditon répétée
Sélection de vitesse automatique
Sélection automatique du diamètre
Selection de vitesse manuelle possible
Détection de la présence d'un disque

Système d'entrainement: Entraînement direct
Moteur: Moteur C.C. sans balai
Système de commande d'entrainement: Réglage d'accrochage de phase par quartz
Plateau de lecture: Aluminium moulé sous pression
Diamètre 30 cm
Vitesses de la platine: 33-1/3 et 45 t/p.m.
Sélecteur de vitesse automatique
(Sélection manuelle possible)
Pleurage et scintillement: 0,012% de valeur efficace*
0,025% de valeur de efficace (JIS C5521)
±% de crête
(IEC 98A Pondéré)

* Mesuré par l'obtention d'un signal provenant du générateur de fréquences incorporé de l'ensemble du moteur.

Ronflement: –56 dB (IEC 98A Non pondéré)
–78 dB (IEC 98A Pondéré)

■ Bras de lecture

Type: Bras de lecture d'alignement linéaire de type à équilibre dynamique avec suspension à la cardan sur 4 pivots
Longueur effective: 105 mm
Angle d'erreur de piste: En deçà de ±0,1°
Masse réelle: 9 g (y compris la cellule pick-up)
Fréquence de résonance: 12 Hz
Moteur d'entrainement du bras de lecture: Moteur C.C.
Capacitance du câble phono: 150 pF

■ Cellule pick-up

Type: Cellule pick-up stéréo à aimant mobile
Circuit magnétique: Noyau entièrement feuilleté
Réponse en fréquence: 10 Hz à 40 kHz
20 Hz à 10 kHz ±1 dB
Tension de sortie: 2,5 mV à 1 kHz; 5 cm/s. zéro à vitesse latérale de crête
(7 mV à 1 kHz; 10 cm/s., zéro à vitesse 45° de crête [DIN 45 000])
Séparation des canaux: 22 dB à 1 kHz
Equilibrage des canaux: En deçà de 1,8 dB à 1 kHz
Impédance de charge recommandée: 47 kΩ~100 kΩ
Elasticité (dynamique): 12 × 10^{-6} cm/dyne à 100 Hz
Plage de la force verticale d'appui: 1,25 ±0,25 g (12,5 ±2,5 mN)
Poids: 6 g (cellule seule)
Remplacement de la pointe de lecture: EPS-30ES
(Pointe de lecture ellipsoïdale.)

Español

ESPECIFICACIONES

Las especificaciones quedan sujetas a cambios sin aviso previo.
Los pesos y las dimensiones indicados son aproximativos.

■ En general

Alimentación de corriente: ~220V, 50 Hz
Consumo de corriente: 10 W
Dimensiones: 43 × 8,8 × 35 cm
(Ancho×Alto×Prof.) 43 × 38,5 × 35 cm
(Altura máxima cuando la parte de arriba (tapa contra el polvo) está abierta.)
Peso: 5,1 kg

■ Sección del plato giratorio

Tipo: Accionamiento directo
Plato giratorio automático
Arranque automático/Comienzo automático
Retorno automática
Parada automática
Ejecución repetida
Selección automática de la velocidad
Es posible seleccionar la velocidad a mano
Selección automática del tamaño
Detección de presencia de disco

Método de accionamiento: Accionamiento directo
Motor: Motor de corriente continua sin escobillas
Método de control de accionamiento: Control enclavado de fase de cuarzo
Platillo del plato giratorio: Aluminio fundido
30 cm de diámetro
Velocidades del plato giratorio: 33-1/3 y 45 rpm
Selección automática de la velocidad
(También posibilidad de seleccionar a mano)
Ululaciones y trémolo: 0,012% WRMS*
0,025% WRMS (JIS C5521)
±0,035% cresta
(IEC 98A Ponderado)

* Medido obteniendo una señal proveniente del generador de frecuencias incorporado del conjunto del motor.
Ruido de rodadura: –56 dB (IEC 98A No ponderado)
–78 dB (IEC 98A Ponderado)

■ Sección del brazo sonoro

Tipo: Brazo sonoro de seguimiento lineal de tipo con equilibrio dinámico con suspensión cardánica de 4 pivotes
Longitud efectiva: 10,5 cm
Angulo de error de seguimiento: Inferior a 0,1° aproxim.
Masa efectiva: 9 g (incluyendo el cartucho)
Frecuencia de resonancia: 12 Hz
Motor de accionamiento del brazo sonoro: Motor de corriente continua
Capitancia del cable del fonógrafo: 150 pF

■ Sección del cartucho

Tipo: Cartucho estereofónico de imán móvil
Circuito magnético: Núcleo totalmente laminado
Respuesta de frecuencia: 10 Hz a 40 kHz
20 Hz a 10 kHz ±1 dB
Voltaje de salida: 2,5 mV a 1 kHz
Velocidad lateral de cero a cresta de 5 cm/s
(7 mV a 1 kHz. Velocidad de 45° de cero a cresta de 10 cm/s [DIN 45 000])
Separación de canales: 22 dB a 1 kHz
Equilibrio de canales: Inferior a 1,8 dB a 1 kHz
Impedancia de carga recomendada: 47 kΩ a 100 kΩ
Elasticidad (dinámica): 12 × 10^{-6} cm/dina a 100Hz
Radio de presión de la aguja: 1,25 ±0,25 g (12,5 ±2,5 mN)
Peso: 6 g (cartucho solamente)
Aguja de recambio: EPS-30ES
(Aguja eliptica)

■ MEASUREMENTS AND ADJUSTMENTS ■■■■ English ■■■■

- **Instruments used**
  1. Oscilloscope
  2. DC voltmeter
  3. 30cm record
  4. Screwdriver

Step	Item	Preparations	Parts adjusted	Procedure
1	**Start position**	1. Put 30cm record on turntable mat and close upper cabinet. 2. Turn the power switch on. 3. Push the "Start" switch.	Start position adjusting screw. **(Fig. 21)**	1. Turn the start position adjusting screw. If it descends between tunes, turn the screw clockwise. If it descends outside the disc, turn the screw counterclockwise.
2	**Clock frequency**	1. Connect lead wire with clip to IC 301 pin ⑦ and pin ㉗ of operation circuit board. 2. Connect oscilloscope to IC 301 pin ⑥.	**VR 301 (Fig. 22)**	1. Set power switch to "on". 2. Adjust VR 301 so that the cycle output waveform is 30 μsec ± 1 μsec. **(Fig. 23)**
3	**Tonearm offset angle**	1. Open the upper cabinet and hold the cabinet switch with tape. 2. Close the upper cabinet.	Adjusting screw **(Fig. 24)**	1. Turn the power switch on and push the start switch to shift the tonearm inward. 2. Open the upper cabinet. 3. Turn the adjusting screw so that the arm center matches the V-groove of the lift bar.
4	**Servo gain and offset voltage**	1. Open the upper cabinet and hold the cabinet switch with the tape. 2. Close the upper cabinet. 3. Connect the DC voltmeter to CN301 terminal ③ and ground terminal. 4. Remove the Label of the tonearm cover.	VR501 (Servo gain) P.C.B. (Offset voltage) **(Fig. 25)**	1. Turn the power switch on and push the start switch to shift the tonearm inward. 2. Open the upper cabinet. 3. Completely shift the tonearm to the right. Then, adjust VR501 so than the voltage is 3.6V. **(Servo gain)** 4. Set the tonearm to the center and make sure that the output voltage is 1.8V. 5. If the voltage is not 1.8V, loosen the printed circuit board screw and move the board to the right or left with a screwdriver so that the output voltage becomes 1.8V. After the adjustment, tighten the printed circuit board screw. **(Offset adjustment)**

■ MESSUNGEN UND JUSTIERUNGEN ■■■■ Deutsch ■■■■

- **Zu verwendende Instrumente**
  1. Osizlloskop
  2. Gleichstrom-Voltmeter
  3. 30 cm—Schallplatte
  4. Schraubendreher

Schritt	Gegenstand	Vorbereitungen für die Justierung	Zu justierende Teile	Justiermethode
1	**Startposition**	1. 30 cm-Platte auflegen und Plattenspieler-Gehäuseoberteil schließen. 2. Den Ein/Aus-Schalter einschalten. 3. Den Startschalter drücken.	Absenkpositions Justierschraube **(Abb. 21)**	1. Die Absenkpositions-Justierschraube derehen. Wenn er zwischen Musikstücken abgesenkt wird, die Schraube im Uhrzeigersinn drehen. 2. Wenn er außerhalb der Platte abgesenkt wird, die Schraube entgegen dem Uhrzeigersinn drehen.
2	**Taktgeber-frequenz**	1) Anschlußdraht mit Klemmen an IC301, Stift ⑦ und Stift ㉗ der Hauptleiterplatte anschließen. 2) Oszilloskop an IC301, Stift ⑥ anschließen.	VR301 **(Abb. 22)**	1) Netzschalter auf "on" stellen. 2) VR301 so justieren, daß Ausgangswellenformperiode 30μs ± 1μs beträgt. **(Abb. 23)**

Schritt	Gegenstand	Vorbereitungen für die Justierung	Zu justierende Teile	Justiermethode
3	**Tonarm-Spurfehlwinkel**	1. Das Gehäuseoberteil öffnen und den Gehäuseschalte mit Klebband in der gedrückten Stellung arretieren. 2. Das Gehäuseoberteil schließen.	Justierschraube **(Abb. 24)**	1. Den Ein/Aus-Schalter einschalten und den Startschalter zum Bewegen den Tonarms nach innen drücken. 2. Das Gehäuseoberteil öffnen. 3. Die Justierschraube so weit drehen, daß die Tonarmmitte mit der V-Kerbe der Liftstange übereinstimmt.
4	**Servo-Verstärkung und Offsetspannung**	1. Das Gehäuseoberteil öffnen und den Gehäuseschalter mit Klebband in der gedrückten Stellung arretieren. 2. Das Gehäuseoberteil schließen. 3. Das Gleichstromvoltmeter an CN301 Anschluß 3 und den Erdungsanschluß anschließen. 4. Das Etikett der Tonarmabdeckung entfernen.	VR501 (Servo-Verstärkung) Leiterplatte (Offsetspannung) **(Abb. 25)**	1. Den Ein/Aus-Schalter einschalten und den Startschalter drücken, um den Tonarm nach innen zu bewegen. 2. Das Gehäuseoberteil öffnen. 3. Den Tonarm vollständig gegen rechts bewegen. VR501 dann so abgleichen, daß die Spannung 3,6V beträgt. (Servo-Verstärkung) 4. Den Tonarm zur Mitte hin stellen und überprüfen, daß die Ausgangsspannung 1,8V beträgt. 5. Falls die Spannung nicht 1,8V beträgt, die Schraube der Leiterplatte lösen und die Platte mit einem Schraubendreher nach links oder rechts bewegen, bis die Ausgangsspannung 1,8V beträgt. Nach der Justierung ist die Befestigungsschraube der Leiterplatte wieder festzudrehen. (Offset-Justierung)

■ MESURAGES ET REGLAGES ■■■■ Français ■■■■

- **Instruments et appareils utilisés**
  1. Oscilloscope
  2. Voltmètre à C.C.
  3. Disque de 30 cm
  4. Tournevis

Etape	Artiele	Préparatifs pour le réglage	Portion du réglage	Méthode de mise au point
1	**Position de démarrage**	1. Ouvrir le boîtier supérieur et placer un disque. 2. Mettre en circuit l'interrupteur d'alimentation. 3. Appuyer sur la touche "Start" (mise en marche).	Vis d'ajustement de la position descendante. **(Fig. 21)**	1. Tourner la vis d'ajustement de la position descendante. Si elle descend entre les plages, tourner la vis dans le sens des aiguilles d'une montre. Si elle descend à l'extérieur du disque, tourner la vis dans le sens inverse des aiguilles d'une montre.
2	**Fréquence des impulsions de rythme**	1) Connecter le fil de jonction à pince à la broche ⑦ et à la broche ㉗ IC301 de la plaquette à circuits imprimés du montage principal. 2) Brancher un oscilloscope à la broche ⑥ de IC301.	VR301 **(Fig. 22)**	1) Régler l'interrupteur d'alimentation sur "on" (marche). 2) Ajuster VR301 de telle sorte que la période de forme d'onde de sortie soit de 30μs ± 1μs. **(Fig. 23)**
3	**Angle de décalage du bras de lecture**	1. Ouvrir la boîtier supérieur et maintenir appuyée la touche du boîtier avec une bande adhésive. 2. Refermer le boîtier supérieur.	Vis de réglage **(Fig. 24)**	1. Mettre en circuit l'interrupteur d'alimentation et sppuyer sur la touche de mise en marche pour faire déplacer le bras de lecture vers l'intérieur. 2. Ouvrir le boîtier supérieur. 3. Tourner la vis de réglage de façon à ce que le centre du bras coïncide avec la rainure en V de la tige d'élévation.

Etape	Artiele	Préparatifs pour le réglage	Portion du réglage	Méthode de mise au point
4	**Amplification servo-mécanique et tension d'écart de réglage**	1. Ouvrir le boîtier supérieur et maintenir appuyée la touche du boîtier avec une bande adhésive. 2. Refermer le boîtier supérieur. 3. Raccorder le voltmètre à C.C. à la borne 3 de CN301 et à la borne de mise à la terre. 4. Retirer l'étiquette adhésive de la coiffe protectrice du bras de lecture.	VR501 (Amplification servo-mécanique) Plaquette à circuis imprimés (Tension d'écart de réglage) **(Fig. 25)**	1. Mettre en circuit l'interrupteur d'alimentation et appuyer sur la touche de mise marche pour faire déplacer le bras de lecture vers l'intérieur. 2. Ouvrir le boîtier supérieur. 3. Déplacer complètement le bras de lecture vers la droite. Puis, ajuster VR501 de telle sorte que la tension soit de 3,6V. (Amplification servo-mécanique.) 4. Régler le bras de lecture au centre et s'assurerque la tension de sortie soit de 1,8V. 5. Si la tension n'est pas de 1,8V, desserrer la vis de la plaquette à circuits imprimés et déplacer la plaquette vers la droite ou vers la gauche avec un tournevis, de telle sorte que la tension de sortie soit de 1,8V. Après la mise au point, resserrer la vis de la plaquette à circuits imprimés. (Ajustement de l'écart de réglage)

■ MEDICIONES Y AJUSTE ■ Español

● **Instrumentos usados**

1. Osciloscopio
2. Voltímetro de CC
3. Disco de 30 cm
4. Destornillador

Paso	Punto tratado	Preparativos para el ajuste	Porción a ajustar	Manera de hacer el ajuste
1	**Posición de arranque**	1. Abrir el gabinete superior y colocar el disco. 2. Poner el interruptor de la corriente. 3. Empujar el interruptor de arranque ("Start").	Tornillo de ajuste de la posición de descenso **(Fig.21)**	1. Hacer girar el tornillo de ajuste de la posición de descenso. Si se cae en medio del disco, girar el tornillo hacia la derecha. Si se cae fuera del disco, girar el tornillo hacia la izquierda.
2	Frecuencia de reloj	1. Conectar pata numero (7) a pata numero (27) de IC301 con cable adicional. (Corto circuito) 2. Conectar osciloscopio a pata numero (6) de IC301.	VR301 **(Fig. 22)**	1. Poner interruptor de corriente en "on". 2. Adjustar onda de salida sea 30μs ± 1μs con VR301. **(Fig. 23)**
3	**Angulo de descentramiento del brazo sonoro**	1. Abrir el gabinete superior y sujetar el interruptor del mismo con cinta. 2. Cerrar el gabinete superior.	Tornillo de ajuste **(Fig. 24)**	1. Poner interruptor de la corriente y apretar el interruptor de arranque para hacer el brazo sonoro se mueva hacia adentro. 2. Abrir el gabinete superior. 3. Girar el tornillo de ajuste de manera tal que el centro del brazo concuerde con la ranura en V de la barra de elevación.
4	**Ganancia del servomecanismo y tensión de desnivel**	1. Abrir el gabinete superior y sujetar el interruptor del mismo con cinta. 2. Cerrar el gabinete superior. 3. Conectar el voltímetro de corriente continua al borne 3 de CN301 a al borne de conexión a tierra. 4. Quitar la etiqueta de la tapa del brazo sonoro.	VR501 (Ganancia del servomecanismo) P.C.B. (Tablero de circuito impreso) (Tensión de desnivel) **(Fig. 25)**	1. Poner interruptor de la corriente y apretar el interruptor de arranque para hacer que el brazao sonoro se desplace hacia adentro. 2. Abrir el gabinete superior. 3. Desplazar el brazo sonoro completamente hacia la derecha. A continuación, regular VR501 de manera tal que la tensión resulte de 3,6V. (Ganancia del servomecanismo) 4. Colocar el brazo sonoro en el centro y asegurarse de que la tensión de salida sea de 1,8V. 5. Si la tensión no corresponde a 1,8V, aflojar el tornillo del tablero de circuito impreso y mover el tablero hacia la derecha o hacia la izquierda usando un destornillador de manera que la tensión de salida resulte de 1,8V. Acabado de regular, volver a apretar el tornillo del tablero de circuito impreso. (Ajuste de desnivel)

■ ADJUSTMENT POINTS

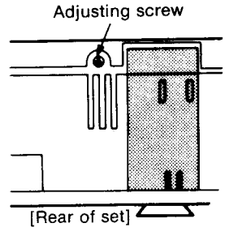


Fig. 21
Abb. 21

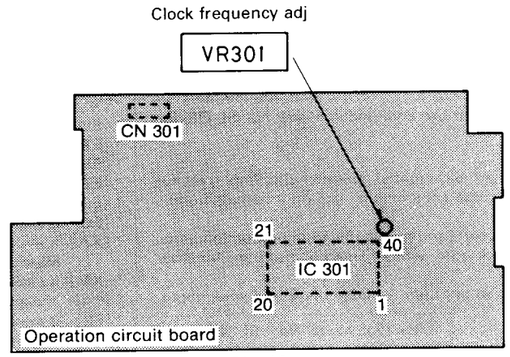


Fig. 22
Abb. 22

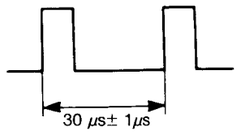


Fig. 23
Abb. 23

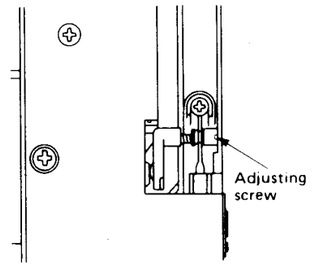


Fig 24
Abb. 24

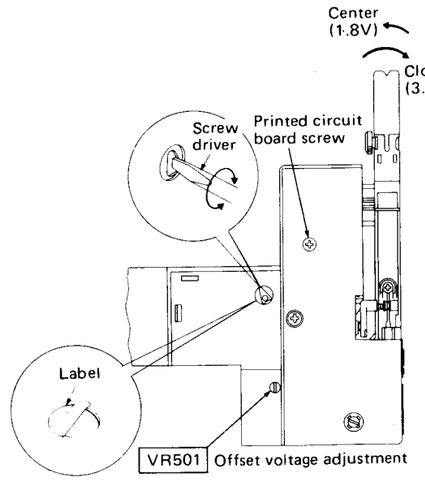


Fig. 25
Abb. 25

CHANGES

■ REPLACEMENT PARTS LIST

Notes:

1. Mentioned in this parts list are only those changed in Model No. SL-QI5 for destination [M] area.
2. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. Ⓚ-marked parts are used for black only, while ○-marked parts are for silver type only.
5. Parts other than Ⓚ-and ○-marked are used for both black and silver types.

Black type model No. : SL-QL5

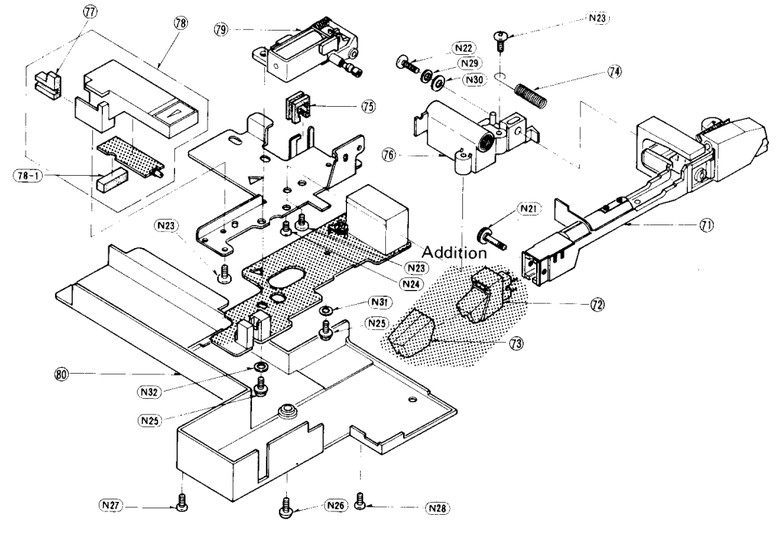
Areas

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EG] is available in F.R. Germany.
* [EB] is available in Belgium.
* [EH] is available in Holland.
* [EF] is available in France.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.
* [PA] is available in far East PX.
* [PE] is available in European Military.
* [PC] is available in European Audio Club.

Ref. No.	Change of Part No. SL-QL5 [M] ➡ SL-QL5/(K)		Part Name & Description	Per Set (Pcs.)	Remarks
SWITCH					
S901	Addition	SFDSHXW225-2 [EK, XA, XM, PA, PE, and PC areas]	Voltage Selector	1	⚠
POWER TRANSFORMER					
T1	SLT48DTL3A	SLT57DT7E [EK, XA, XM, PA, PE, and PC areas]	Power Source	1	⚠
		SLT48DTE13E [XL]	Power Source	1	⚠
		SLT48DT10E [Other areas]	Power Source	1	⚠
FUSES					
F1	Addition	XBA2CO2T1B [EK, XA, XM, PA, PE, and PC areas]	250V, T200mA	1	⚠
		XBA2C05T1B [Other areas]	250V, T500mA	1	⚠
F2	Addition	XBA2C06T1B [EK, XA, XM, PA, PE, and PC areas]	250V, T630mA	1	⚠
CABINET and CHASSIS PARTS					
6	SFNNQL5M01	SFNNQL5G02 [EK]	Name Plate	1	
		SFNNQL5S01 [E, Ei, EC]	Name Plate	1	
		SFNNQL5G01 [XL]	Name Plate	1	
		SFNNQL5X01 [XA, XM]	Name Plate	1	
		SFNNQL5P01 [PA, PE]	Name Plate	1	
		SFNNQL5P02 [PC]	Name Plate	1	
		SFNNQL5R01 [Other areas]	Name Plate	1	
10	SFACQL5N01	SFNNQL5N01	Cabinet (Silver)	1	○
		SFACQL5S21	Cabinet (Black)	1	Ⓚ
13	SFNZQL5M01	SFNZQL5M01	Label (Silver)	1	○
		SFNZQL5M21	Label (Black)	1	Ⓚ
25	SFGCC05N02	SFGCC05X01 [EK, XA, XM, PA, PE, and PC areas]	Cushion Rubber, Power Transformer	2	
		SFGCC05N02 [Other areas]	Cushion Rubber, Power Transformer	2	

Ref. No.	Change of Part No. SL-QL5 [M] ➡ SL-QL5/(K)		Part Name & Description	Per Set (Pcs.)	Remarks
CABINET and CHASSIS PARTS					
32	SFADD05N01E	SFADD05N01E	Dust Cover Ass'y (Silver)	1	○
		SFADD05S21E	Dust Cover Ass'y (Black)	1	Ⓚ
54	SFDJHSC0491	SFDJHSC0498 [EK]	AC Socket	1	⚠
		SFDJHSC0491 [XL]	AC Socket	1	⚠
		SFDJHSC04912 [XA, XM, PA, PE, and PC areas]	AC Socket	1	⚠
		SFDJHSC0492 [Other areas]	AC Socket	1	⚠
TONEARM PARTS					
72	Addition	EPC-P28S [PA, PE, PC]	★ Cartridge	1	
		EPC-P30S [Other areas]	★ Cartridge	1	
73	Addition	EPS-P28ES [PA, PE, PC]	★ Stylus	1	
		EPS-P30ES [Other areas]	★ Stylus	1	
ACCESSORIES					
A1	SFNUQL5M01	SFNUQL5G01 [EK]	Instruction Book	1	
		SFNUQL5R01 [EG]	Instruction Book	1	
		SFNUQL5F01 [EF]	Instruction Book	1	
		SFNUQL5I01 [Ei]	Instruction Book	1	
		SFNUQL5X01 [XL, XA, XM]	Instruction Book	1	
		SFNUQL5P01 [PA, PE, PC]	Instruction Book	1	
		SFNUQL5S01 [Other areas]	Instruction Book	1	
A4	SFDAC05M01	SFDAC05G02 [EK]	AC Cord	1	⚠
		SFDAC05L01 [XL]	AC Cord	1	⚠
		SFDAC05X02 [XA, XM]	AC Cord	1	⚠
		SFDAC05N01 [PA, PE, PC]	AC Cord	1	⚠
		SFDAC05E02 [Other areas]	AC Cord	1	⚠
A5	Addition	SFDKI19118 [XA, XM] only	2pin Plug	1	⚠
A6	Addition	QJP0603S [PA, PE, PC] only	Adaptor, Gimens	1	⚠
PACKING PARTS					
P1	SFHPQL5M01	SFHPQL5C01 [EF] only	Carton Box (Silver)	1	○
		SFHPQL5M01 [Other areas]	Carton Box (Silver)	1	○
		SFHPQL5C21 [EF]	Carton Box (Black)	1	Ⓚ
		SFHPQL5M21 [Other areas]	Carton Box (Black)	1	Ⓚ

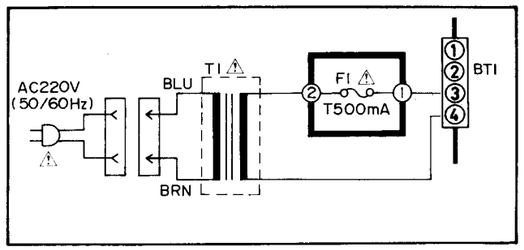
■ EXPLODED VIEW



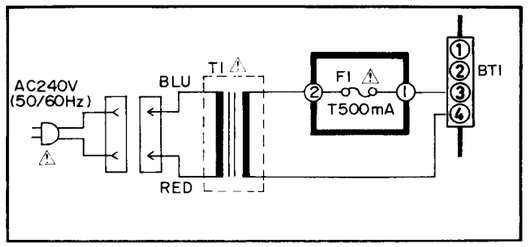
■ SCHEMATIC DIAGRAM

- **Power source circuit**

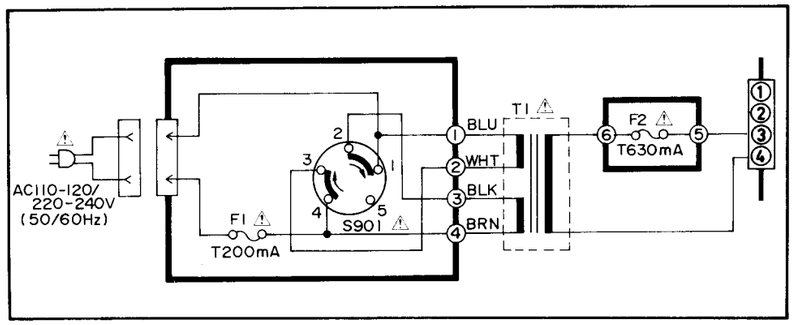
※ **Product for continental Europe**



※ **Product for Australia.**



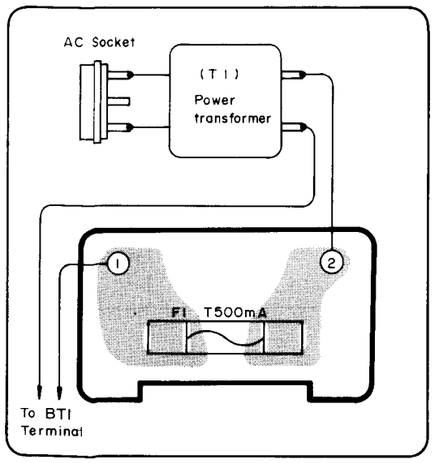
※ **Product for** [EK], [XA], [XM], [PA], [PE], and [PC], areas.



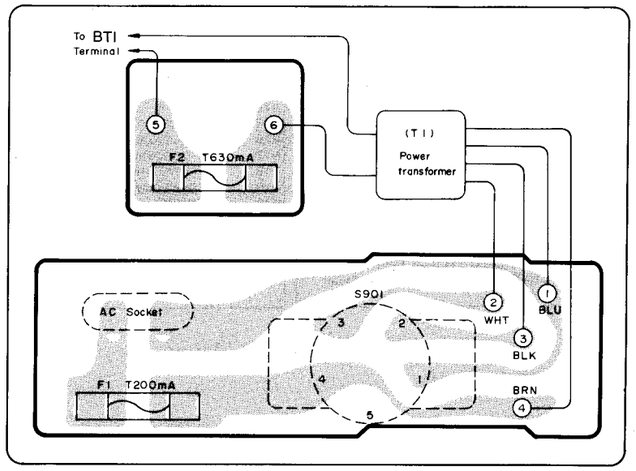
■ PRINTED CIRCUIT BOARD

- **Power source circuit**

※ **Product for Continental Europe and Australia.**



※ **Product for** [EK], [XA], [XM], [PA], [PE], and [PC], areas.



■ RESISTORS and CAPACITORS

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. This "Ⓢ" mark is service standard parts and may differ from production parts.
4. Unless otherwise specified. All resistors are in OHMS (Ω) K = 1000Ω, M = 1000kΩ All capacitors are in MICROFARADS (μF) P = 10^{-6} μF

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERG	1	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : ±5%
ERX : Metal Film	1 : 1W	G : ±2%
ERTD : Thermister		

ERD2FCG□□□ ⟶ Fuse type carbon (1/4W)
ERD10TLJ □□□ ⟶ Chip type carbon (1/8W)
ECUV1H □□□ ⟶ Chip type ceramic

Capacitor Type	Voltage: ECEA Type	Voltage: Others	Tolerance
ECEA : Electrolytic	1A : 10V	1H : 50V DC	J : ±5%
ECEB : Electrolytic	1C : 16V	2H : 500V DC	K : ±10%
ECKD : Ceramic	1E : 25V	1 : 100V	Z : +80%, −20%
ECQM : Polyester	1V : 35V		P : +100%, −0%
	1H : 50V		M : ±20%
	50 : 50V		

Ref. No.	Part No.	Value
RESISTORS		
RF1 ⚠	ERD2FCG180	18
R1	ERDS2TJ681	680
R2	ERDS2TJ221	220
R103	ERD10TLJ104U	100K
R104	ERX1ANJ2R7	2.7
R105	ERD10TLJ270U	27
R201	ERD10TLJ393U	39K
R202	ERD10TLJ394U	390K
R203	ERD10TLJ680U	68
R204	ERD10TLJ151U	150
R205	ERD10TLJ223U	22K
R207	ERD10TLJ102U	1K
R208	ERD10TLJ680U	68
R301	ERDS2TJ562	5.6K
R302	ERDS2TJ331	330
R303	ERDS2TJ182	1.8K
R304	ERDS2TJ562	5.6K
R305	ERDS2TJ562	5.6K
R306	ERDS2TJ331	330
R307	ERDS2TJ331	330
R308	ERDS2TJ562	5.6K
R309	ERDS2TJ332	3.3K
R310	ERDS2TJ332	3.3K
R311	ERDS2TJ102	1K
R312	ERDS2TJ333	33K
R313	ERDS2TJ333	33K
R314	ERDS2TJ333	33K
R315	ERDS2TJ333	33K
R316	ERDS2TJ332	3.3K
R317	ERDS2TJ332	3.3K
R318	ERDS2TJ332	3.3K
R319	ERDS2TJ332	3.3K
R320	ERDS2TJ272	2.7K
R321	ERDS2TJ272	2.7K
R322	ERDS2TJ272	2.7K
R323	ERDS2TJ272	2.7K
R324	ERDS2TJ271	270
R325	ERDS2TJ821	820
R326	ERDS2TJ222	2.2K
R327	ERDS2TJ272	2.7K
R328	ERDS2TJ331	330
R329	ERDS2TJ272	2.7K
R330	ERDS2TJ272	2.7K
R331	ERDS2TJ272	2.7K
R332	ERDS2TJ103	10K
R333	ERDS2TJ223	22K
R334	ERDS2TJ562	5.6K
R335	ERDS2TJ222	2.2K
R336	ERDS2TJ224	220K
R337	ERDS2TJ104	100K
R338	ERDS2TJ103	10K
R339	ERDS2TJ333	33K
R340	ERDS2TJ562	5.6K
R341	ERDS2TJ222	2.2K
RF401 ⚠	ERD2FCG330	33
R401	ERDS2TJ683	68K
R402	ERDS2TJ683	68K
R403	ERDS2TJ122	1.2K
R404	ERDS2TJ472	4.7K
R405	ERDS2TJ681	680
R406	ERDS2TJ272	2.7K
R407	ERDS2TJ152	1.5K
R408	ERDS2TJ102	1K
R409	ERDS2TJ224	220K
R410	ERDS2TJ152	1.5K
R411	ERDS2TJ102	1K
R412	ERDS2TJ224	220K
R413	ERDS2TJ101	100
R414	ERDS2TJ471	470
R415	ERDS2TJ101	100
R416	ERDS2TJ471	470
R501	ERDS2TJ331	330
R502	ERDS2TJ561	560
R503	ERDS2TJ820	82
R504	ERTD2FFK251S	250
R601	ERDS2TJ681	680
CAPACITORS		
C1 ⚠	ECQM1223KZ	0.022
C2 ⚠	ECQM1223KZ	0.022
C3 ⚠	ECQM1223KZ	0.022
C4 Ⓢ	ECEB1VU102	1000
C5 Ⓢ	ECEA1CU330	33
C101 Ⓢ	ECEA1CU330	33
C102 Ⓢ	ECEA50ZR22	0.22
C103 Ⓢ	ECQM1H274JZ	0.27
C105 ⚠ Ⓢ	ECEA1CN470S	47
C106 ⚠ Ⓢ	ECEA1CN470S	47
C107 Ⓢ	ECEA50Z1	1
C201 Ⓢ	ECEA1AU470	47
C202 Ⓢ	ECEA50ZR22	0.22
C203 Ⓢ	ECQM1H683JZ	0.068
C204	ECUV1H121JCM	120P
C205	ECUV1H1330JCM	33P
C206	ECUV1H101JCM	100P
C207 Ⓢ	ECEA1AU470	47
C208 Ⓢ	ECEA1AU470	47
C301 Ⓢ	ECEA0JU470	47
C302	ECFR1H104ZF	0.1
C303 Ⓢ	ECCD1H680K	68P
C304	ECFR1H104ZF	0.1
C305 Ⓢ	ECQM1H104JZ	0.1
C306 Ⓢ	ECEA1HU3R3	3.3
C307 Ⓢ	ECKD1H102KB	0.001
C308 Ⓢ	ECKD1H102KB	0.001
C401 Ⓢ	ECEA1CU330	33
C402 Ⓢ	ECQM1H223JZ	0.022
C403 Ⓢ	ECQM1H223JZ	0.022
C404 Ⓢ	ECEA0JU470	47
C405 Ⓢ	ECEA0JU470	47
C501 Ⓢ	ECEA1CU101	100
C601	ECFB1B104ZRM	0.1

■ REPLACEMENT PARTS LIST

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "Ⓢ" mark is servico standard parts and may differ from production parts.
5. The parenthesized numbers in the columns of description stand for the quantity per set.
6. Ⓚ -marked parts are used for black only, while ○-marked parts are for silver type only.
7. Parts other than Ⓚ - and ○-marked are used for both black and silver types.

Areas

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EG] is available in F.R. Germany.
* [EB] is available in Belgium.
* [EH] is available in Holland.
* [EF] is available in France.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.
* [PA] is available in far East PX.
* [PE] is available in European Military.
* [PC] is available in European Audio Club..

Black type model No. : SL-QL5/(K)

Ref. No.	Part No.	Description
INTEGRATED CIRCUIT		
IC1	SVIUPC7812H	Regulator, 12V
IC101	AN6638	Turntable Drive
IC201	AN6683	Turntable Control
IC301	MN1421FPC	Micro Computer
IC401	AN6554	Comparator
TRANSISTORS		
Q1	2SD638	Regulator, 5V
Q301	2SD636	Switching
Q302	2SD892	Switching
Q303	2SD636	Offset Error Angle Det
Q304	2SB641	Offset Error Angle Det
Q305, 306	2SD636	Switching
Q401,402 Ⓢ	2SD973S	Tonearm Motor Control
Q403, 404	2SD892	Tonearm Motor Control
DIODES		
D1 ⚠	SVDS1RBA20Z	Rectifier
D2	MA4056	5.6V Zener
D301	SVDGL9-PR2F1	Cueing Up Indicator
D302, 303 304	MA165	Switching
D305	MA4062	6.2V Zener
D306	SVDGL-9PR2F1	Repeat Indicator
D501	MA162A	Switching
D502	SVDPR3432S	Tonearm Indicator

Ref. No.	Part No.	Description
SWITCHES		
S1 ⚠	SFDSC05N08	On/Off (Power)
S301~304	EVQQJ104K	Start, Stop, Cueing, Repeat
S305	SFDSHSW0699	Speed Selector
S306	SFDSD05N01	Record Detection
S307	SFDSD05N01	Cabinet (Reset)
S601	SFDSD2MSL-C	Ret Position Detection
S701	SFDSC05N02	Record Size Detection
S901 [EK, XA, XM, PA, PE, PC] only ⚠	SFDSHXW225-2	Voltage Seletor
CRYSTAL		
X201	SVQSH41TR	4.193MHz OSC
PHOTO INTERRUPTERS		
PC501	ON1262	Offset Sensor
PC601	ON1261	Tonearm Position Sensor

Ref. No.	Part No.	Description
VARIABLE RESISTORS		
VR301	EVN61AA00B54	Clock Frequency Adjustment, 50kΩ (B)
VR501	EVNK6JA00B14	Servo Gain Adjustment, 10kΩ (B)
RELAY		
RL501	SFDYAW6945	Muting Relay
POWER TRANSFORMER		
T1[EK,XA, XM,PA, PE,PC] ⚠	SLT57DT7E	Power Source
T1[XL] ⚠	SLT48DTE13E	Power Source
T1[Other Areas] ⚠	SLT48DT10E	Power Source
FUSE		
F1[EK,XA, XM, PA,PE,PC,] ⚠	XBA2C02T1B	250V,T 200mA
F1[Other Areas] ⚠	XBA2C05T1B	250V,T 500mA
F2[EK,XA, XM, PA,PE,PC] only ⚠	XBA2C06T1B	250V,T 630mA

Ref. No.	Part No.	Description
CABINET AND CHASSIS PARTS		
1	SFWEC06N01	Adaptor, 45r.p.m (1)
2	SFQAC06N01	Spring, 45r.p.m. Adaptor (1)
3	SFTGQ05N01	Turntable Mat (1)
4	SFTEQ05N01	Turntable Platter (1)
5	SFTMC07-01E	Rotate Magnet Ass'y (1)
6[EK]	SFNNQL5G02	Name Plate (1)
6[E,EI,EC]	SFNNQL5S01	Name Plate (1)
6[XL]	SFNNQL5G01	Name Plate (1)
6[XA,XM]	SFNNQL5X01	Name Plate (1)
6[PA,PE]	SFNNQL5P01	Name Plate (1)
6[PC]	SFNNQL5P02	Name Plate (1)
6[Other Areas]	SFNNQL5R01	Name Plate (1)
7	SFATQ15N01A	Hinge (Right Side) (1)
8	SFATQ15N02A	Hinge (Left Side) (1)
9	SFKKQL5N02	Ornament Plate (1)
10 ○	SFACQL5N01	Cabinet (Silver) (1)
10 Ⓚ	SFACQL5S21	Cabinet (Black) (1)
11	SFUMC05N15	Holder, Rest Switch and Record Detecting Switch (2)
12	SFQPC05N01	Spring, Reset Switch (1)
13 ○	SFNZQL5M01	Label (Silver), Speed Select (1)
13 Ⓚ	SFNZQL5M21	Label (Black), Speed Select (1)
14	SFUMD05N03	Rod, Speed Select Switch (1)
15	SFKTQL5N01	Button, Operation (1)
16	SFKTD05N02	Knob, Speed Select (1)
17	SFMGQ34N01	Cover, Stator Coil (1)
18	SFMZC06N01R	Stator Frame Ass'y (1)
19	SFUMQL5N01E	Lever, Record Detecting (1)
20	SFUMQ15N03	Holder, L.E.D. (1)
21	SFUPQL5N01	Holder, Operation Button (1)
22	SFAUL12M01	Bottom Board (1)
23	SFGAC05N02	Insulator (4)
24	SFQCC05N01	Spring, Insulator (4)
25[EK,XA, XM,PA, PE,PC]	SFGCC05X01	Cushion Rubber, Power Transformer (2)
25[Other Areas]	SFGCC05N02	Cushion Rubber, Power Transformer (2)
26	SFGZC05N03	Cushion Rubber, Power Transformer (1)
27	SFKTQ15N03	Knob, Power Switch (1)
28	SFXJBL3N02E	Shaft Ass'y Power Switch (1)
29	SFUMQ15N04	Stopper, Operation Circuit Board (1)
30	SFQABL3N02	Spring, Power Switch Shaft (1)
31	SFUMBL3N05	Holder, Power Switch Shaft (1)
32 ○	SFADD05N01E	Dust Cover Ass'y (Silver) (1)
32 Ⓚ	SFADD05S21E	Dust Cover Ass'y (Black) (1)
32-1	SFAD130-02	Cushion Rubber, Dust Cover (2)
33	SFKKQL5N01	Record Groove Scale Plate (1)
34	SFGCC05N03	Rubber Spacer (3)
35	SFGCD05N01	Rubber Spacer (2)
36	SFGCC05N06	Rubber Spacer (2)
37	SFUZC05N03	Latch, Lead Wires Holder (1)
38	SFUMC05N20	Holder, Lead Wires (1)
39	SFUKD05N01A	Base, Tonearm (1)
40	SFUMC05N17	Wheel, Tonearm Drive (1)
41	SFUMC05N02A	Rest Switch Ass'y (1)
42	SFUMQL5N02A	Worm Gear Ass'y (1)
43	SFGBC10-01	Belt, Tonearm Drive Motor (1)

Ref. No.	Part No.	Description
CABINET AND CHASSIS PARTS		
44	SFMHC05N01E	Tonearm Drive Motor Ass'y (1)
45	SFUZC05N01	Rod, Rest Switch (1)
46	SFXJC05N01	Guide Rail, Tonearm (1)
47	SFGCC05N05	Cushion Rubber, Guide Rail (2)
48	SFUPC05N03	Bracket, Guide Rail (1)
49	SFUMD05N02	Cover, Tonearm Base (B) (1)
50	SFUMD05N01	Cover, Tonearm Base (A) (1)
51	SFUZC05N02E	Rope Ass'y (1)
52	SFUMC06N11	Cap, Pulley (3)
53	SFUMC05N22	Pulley, Rope Ass'y (3)
54[EK] ⚠	SFDJHSC0498	AC Socket (1)
54[XL] ⚠	SFDJHSC0491	AC Socket (1)
54[XA, XM, PA, PE, PC] ⚠	SFDJHSC0491Z	AC Socket (1)
54 [Other Areas] ⚠	SFDJHSC0492	AC Socket (1)
55	SFDHC05N02E	Phono Output Jack Ass'y (1)
56	SFUMQ05N02A	Record Size Detector Ass'y (1)
57	SFUMC05N11A	Record Detector Ass'y (1)
58	SFUMC05N06	Guide, Rest Switch Rod (1)
TONEARM PARTS		
71	SFPAM00501A	Tonearm Ass'y (1)
72[PA, PE,PC]	EPC-P28S	★Cartridge (1)
72[Other Areas]	EPC-P30S	★Cartridge (1)
73[PA, PE,PC]	EPC-28ES	★Stylus (1)
73[Other Areas]	EPC-30ES	★Stylus (1)
74	SFPSP00503	Spring, Lead Wire (1)
75	SFPGM00502	Holder, AC cord/Phono OutputCord (1)
76	SFPAB00502	Bracket, Tonearm (1)
77	SFPGM00503	Rubber Spacer (1)
78	SFPAB00501E	Tonearm Position Indicator Ass'y (1)
78-1	SFPGM00505	Holder, L.E.D Circuit Board (1)
79	SFPZB00503E	Lift Solenoid Ass'y (1)
80	SFPCS00501	Cover, Tonearm Base (1)
SCREWS, WASHERS AND NUT		
N1 Ⓢ	XTV3+10BFN	Screw, ⊕ 3×10 (20)
N2 Ⓢ	XTN3+6BFZ	Screw, ⊖ 3×6 (3)
N3	XTN3+5J	Screw, (3)
N4	XTW3+10Q	Screw, (1)
N5 Ⓢ	XTV3+20BFN	Screw, ⊕ 3×20 (5)
N6 Ⓢ	XTV3+20BFZ	Screw, ⊕ 3×20 (2)
N7	SFXGD05N01	Screw (2)
N8 Ⓢ	XTV3+8BFN	Screw, ⊕ 3×8 (1)
N9	SFXGC05N02	Screw (3)
N10	SFXGC05N03	Screw (2)
N11	XTW3+14QFYR	Screw, (6)
N12 Ⓢ	XTV3+6BFN	Screw, ⊕ 3×6 (4)
N13	XWC3B	Washer, φ3 (1)
N14	XUB3FP	Washer, φ3 (1)
N15	SFXW551D2	Washer (1)
N16	SFGCC05N04	Washer (3)
N17	SFGCD05N02	Washer (2)
N18	SFXWC05N07	Washer (3)
N19	SFXWC06N02	Washer (1)
N20	XNC3HS	Nut, φ3 (5)

Ref. No.	Part No.	Description
SCREWS, WASHERS AND NUT		
N21	SFPEV00502	Screw, Cartridge (1)
N22 Ⓢ	XSN3+12S	Screw, ⊕ 3×12 (1)
N23 Ⓢ	XTN3+8BFZ	Screw, ⊕ 3×8 (2)
N24 Ⓢ	XTN26+6BFZ	Screw, ⊕ 2.6×6 (1)
N25	XTW26+6JFZ	Screw, ⊕2.6×6 (2)
N26 Ⓢ	XTV3+10BFZ	Screw, ⊕3×10 (1)
N27	XTN2+6JFZ	Screw, ⊕2×6 (1)
N28	XTN2+4JFZ	Screw, ⊕2×4 (1)
N29 Ⓢ	XWA3B	Washer, φ3 (1)
N30 Ⓢ	XWG3	Washer, φ3 (1)
N31	XWC26AFY	Washer, φ2.6 (1)
N32	SFPEW00701	Washer (1)

Ref. No.	Part No.	Description
ACCESSORIES		
A1 [EK]	SFNUQL5G01	Instruction Book (1)
A1[EG]	SFNUQL5R01	Instruction Book (1)
A1[EF]	SFNUQL5F01	Instruction Book (1)
A1[Ei]	SFNUQL5I01	Instruction Book (1)
A1[XL, XA,XM]	SFNUQL5X01	Instruction Book (1)
A1[PA, PE,PC]	SFNUQL5P01	Instruction Book (1)
A1[Other Areas]	SFNUQL5S01	Instruction Book (1)
A2	SFDHC05N01	Phono Output Cord (1)
A3	SFDLC05N01	Ground Wire (1)
A4[EK] ⚠	SFDAC05G02	AC Cord (1)
A4[XL] ⚠	SFDAC05L01	AC Cord (1)
A4[XA, XM,] ⚠	SFDAC05X02	AC Cord (1)
A4[PA, PE,PC] ⚠	SFDAC05N01	AC Cord (1)
A4[Other Areas] ⚠	SFDAC05E02	AC Cord (1)
A5[XA, XM,]only ⚠	SFDKI19118	2 Pin Plug (1)
A6[PA,PE, PC]only ⚠	QJP0603S	Adaptor, Gimens (1)
PACKING PARTS		
P1 [EF] only ○	SFHPQL5C01	Carton Box (Silver) (1)
P1 [Other Areas] ○	SFHPQL5M01	Carton Box (Silver) (1)
P1[EF] only Ⓚ	SFHPQL5C21	Carton Box (Black) (1)
P1 [Other Areas] Ⓚ	SFHPQL5M21	Carton Box (Black) (1)
P2	SFHHL13R01	Pad, Front (1)
P3	SFHHL13R02	Pad, Rear (1)
P4	SFHKC05N01	Clamper, Turntable (3)
P5	SFHKC05N02	Spacer, Tonearm (1)
P6	SFHSL13R01	Spacer, Dust Cover (1)
P7	SFHDQ06N01	Pad, Turntable Mat (1)
P8	SFYF33B35	Polyethylene Bag, Turntable Mat (1)
P9	SFYH60×60	Polyethylene Bag, Set (1)
P10	SFYH18×17	Polyethylene Bag, Accessories (1)

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ORDER NO. DAD84030069C1

Service Manual

Quartz Direct Drive Automatic Turntable System

SL-QL5

[M],[MC]

T4P is the standard mark for the "P-mount" plug-in-connector system. Products carrying this mark are inter-changeable and compatible with each other.

Areas

* [M] is available in U.S.A.
* [MC] is available in Canada.

***The cartridge shown here is an option.**

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply:	120 V AC, 60 Hz
Power consumption:	10W
Dimensions: (W×H×D)	43 × 8.8 × 35 cm (16-59/64" × 3-1/2" × 13-25/32") 43 × 38.5 × 35 cm (16-59/64" × 15-23/64" × 13-25/32") (Maximum height when dust cover is open.)
Weight:	5.1 kg (11.2lb.)

■ Turntable section

Type:	Direct drive Fully automatic turntable
Features:	Auto start/Auto lead-in Auto return Auto stop Repeat play Auto speed select Manual speed selection possible Auto size select Record presence detection
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	Quartz-phase-locked control
Turntable platter:	Aluminum die-cast Diameter 30 cm (12")
Turntable speeds:	33-1/3 rpm and 45 rpm Auto speed select (Manual selection possible)
Wow and flutter:	0.012% WRMS* 0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A Weighted)

* Measured by obtaining signal from built-in frequency generator of motor assembly.

Rumble:	−56 dB (IEC 98A Unweighted) −78 dB (IEC 98A Weighted)

■ Tonearm section

Type:	Dynamic balanced type Linear tracking tonearm 4-pivot gimbal suspension
Effective length:	10.5 cm (4-1/8")
Tracking error angle:	Within ±0.1°
Effective mass:	9 g (including cartridge)
Resonance frequency:	12 Hz
Tonearm drive motor:	DC motor
Phono cable capacitance:	150 pF

Technics

Matsushita Engineering and Service Company
50 Meadowland Parkway,
Secaucus. New Jersey 07094

Panasonic Hawaii Inc.
91-238 Kauhi St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

Matsushita Electric of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

Panasonic Sales Company, Division of Matsushita Electric of Puerto Rico, Inc.
Ave, 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

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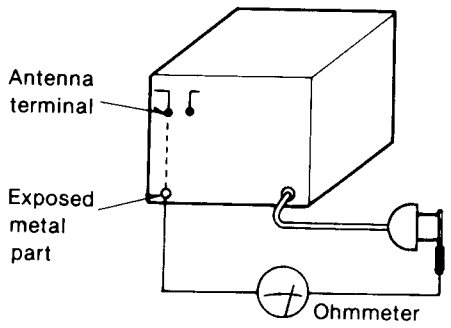
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

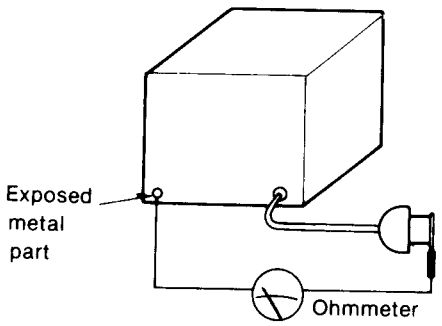
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ

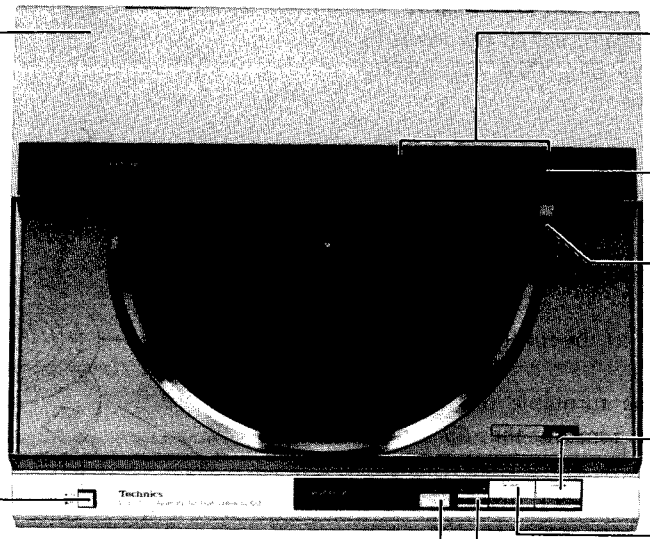


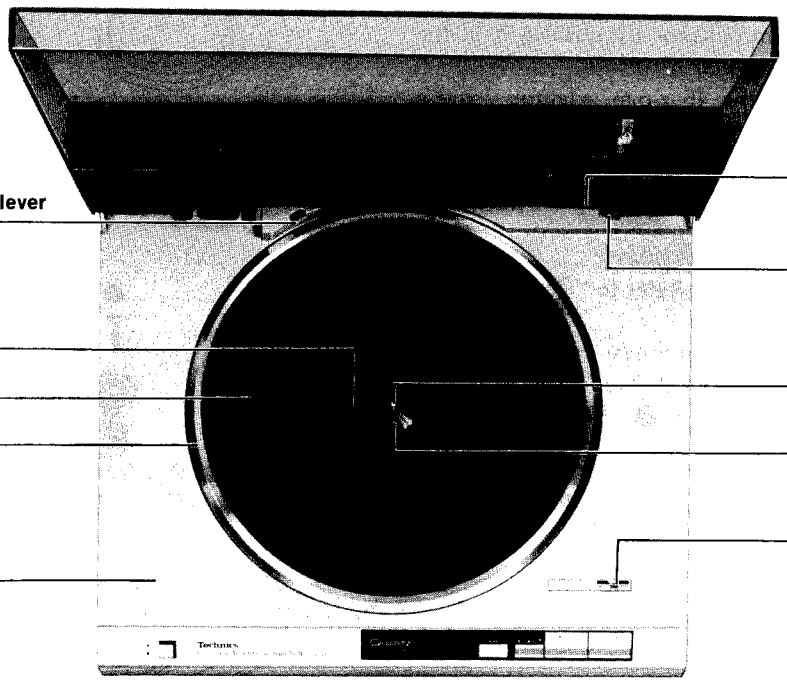
(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ LOCATION OF CONTROLS





■ DISASSEMBLY INSTRUCTIONS

• How to remove the cartridge

1. Open the upper cabinet.
2. Remove the setscrew and pull out the cartridge. **(Fig. 1)**
3. When attaching the cartridge again, match the tonearm connector with the cartridge pin, then completely insert it and tighten the setscrew.

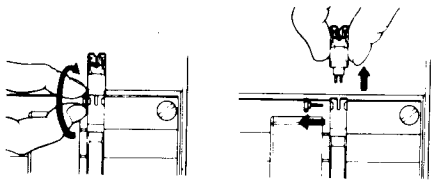


Fig. 1

• How to remove the turntable platter

1. Open the upper cabinet.
2. Remove the turntable mat and lift the turntable platter. (Fig. 2)

   Note: (1) When removing the turntable platter, it is not necessary to remove the 45 r.p.m. adaptor.

   (2) The turntable platter is tight fitted on to the center spindle. When removing the turntable platter, take care not to give damage to the upper cabinet, arm motor cover and tonearm cover.

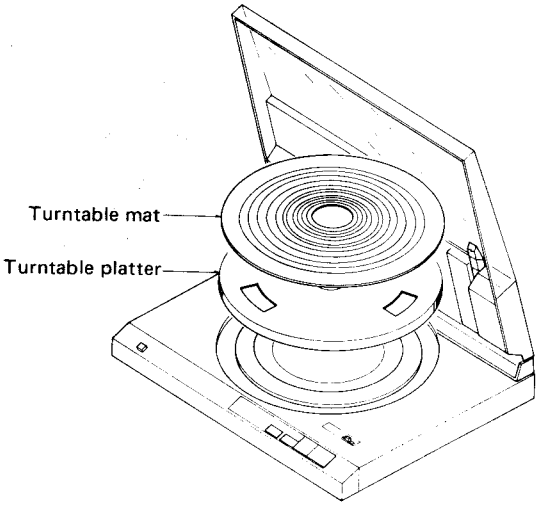


Fig. 2

• How to remove the 45 r.p.m. adaptor

1. Remove the turntable platter.
   (Refer to "How to remove the turntable platter.")
2. The 2 adaptor claws fit into the turntable platter, and so remove the 45 r.p.m. adaptor by pushing it in the direction of the arrow. **(Fig. 3)**

   Note: When removing the 45 r.p.m. adaptor, remove the turntable platter, otherwise the 45 r.p.m. adaptor claws will be broken.

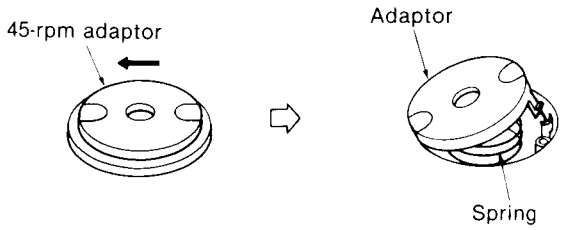


Fig. 3

• How to remove the bottom board

1. Remove the turntable platter. **(Refer to "How to remove the turntable platter.")**
2. Close the upper cabinet and turn over the unit on a soft cloth taking care not to damage the upper cabinet.
3. Remove the 6 setscrews (**Fig. 4** ❶ ~ ❻), 4 Insulators and 4 springs (**Fig. 4**).

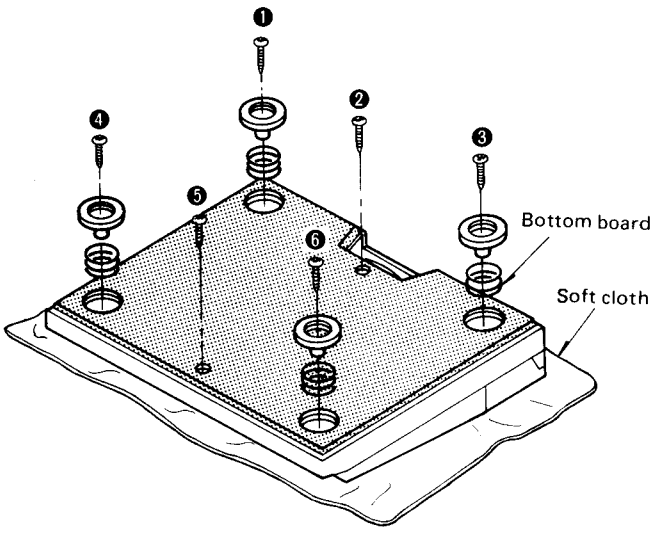


Fig. 4

- **How to remove the operation circuit board**

1. Remove the bottom board. **(Refer to "How to remove the bottom board.")**
2. Remove the 7 operation circuit board setscrews **Fig. 5: ❼~⓭) and the stopper.**

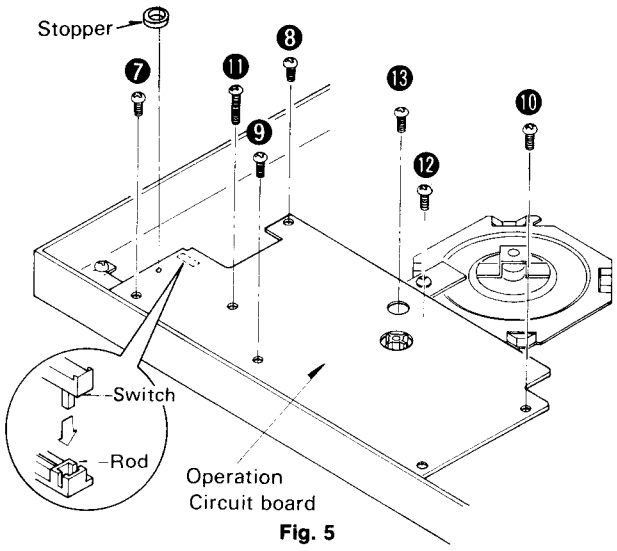


Fig. 5

- **How to remove the drive circuit board and stator frame**

1. Remove the operation circuit board **(Refer to "How to remove the operation circuit board.")**
2. Remove the 4 setscrews **(Fig. 6: ⓱~⓴)** of the stator frame.
3. Pull out connector CN101, then remove the drive circuit board with stator frame.
4. Cut off the stopper by nippers and remove the 4 setscrews **(Fig. 7: ㉑~㉔)** to separate the drive circuit board and stator frame.

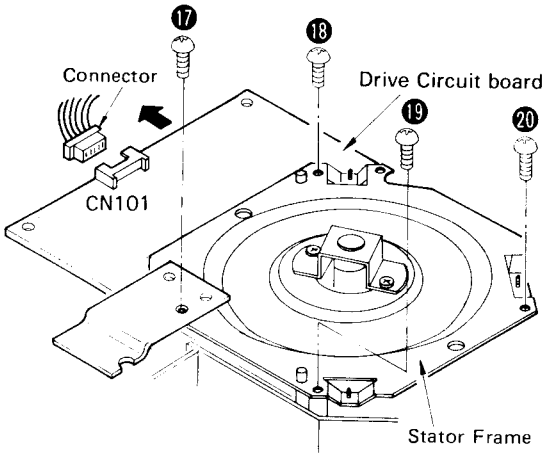


Fig. 6

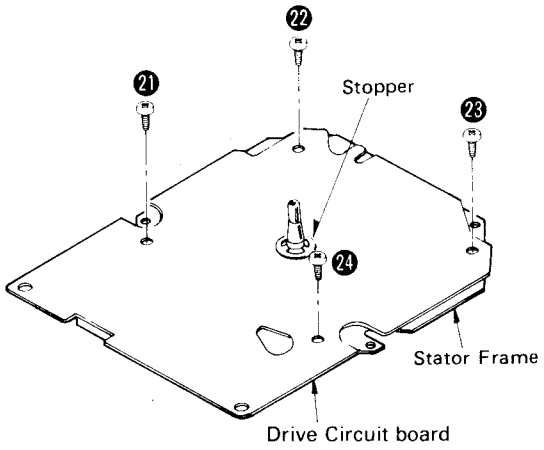


Fig. 7

- **How to separate the upper cabinet and lower cabinet**

1. Remove the bottom board. **(Refer to "How to remove the bottom board.")**
2. Pull out the 2 connectors **(CN301, CN401)** from the operation circuit board. **(Fig. 8)**
3. Remove the 4 hinge setscrews **(Fig. 9: ㉕ ~ ㉘)** and the phono output jack.
4. Release the claws and slowly lift the lower cabinet to separate it from the upper cabinet.

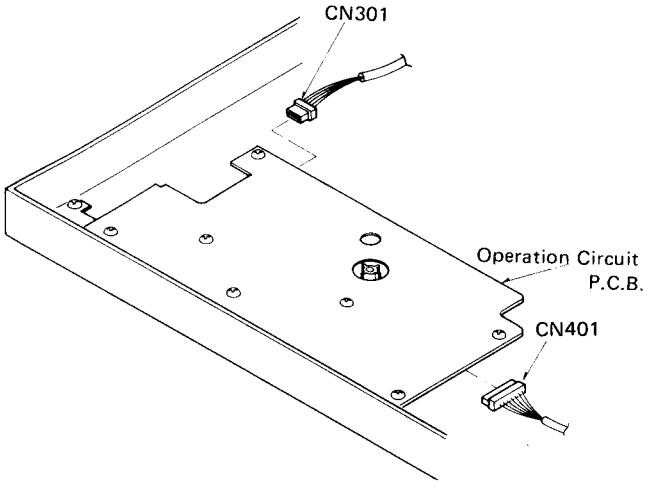


Fig. 8

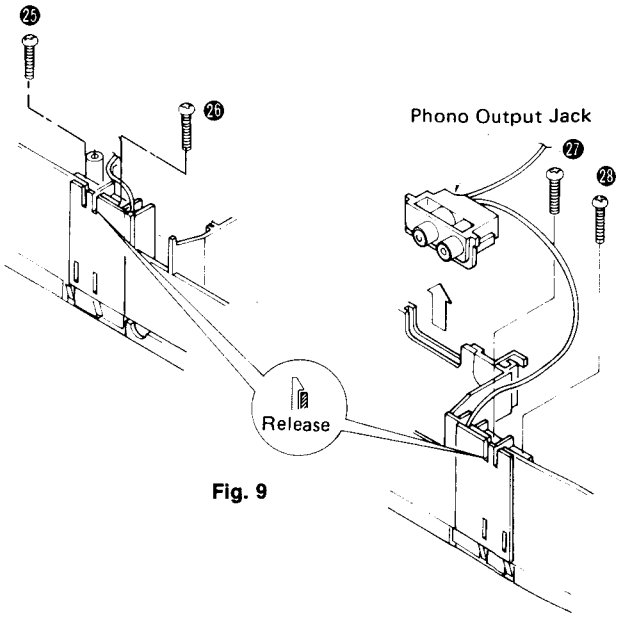


Fig. 9

• How to remove the dust cover

1. Open the upper cabinet.
2. Remove the 4 setscrews **(Fig. 10: ㉙~㉜)**.
3. Remove the 5 dust cover setscrews **(Fig. 10: ㉝~㉟) and Fig. 11: ㊱, ㊲)**.

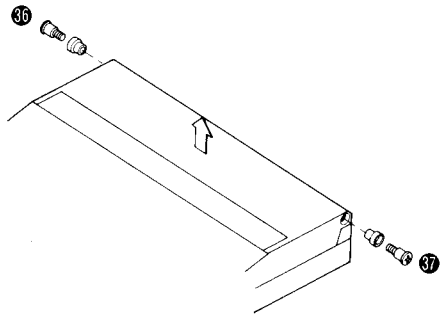


Fig. 11

• How to remove the tonearm position detecting circuit board.

1. Open the upper cabinet and remove the arm motor cover. **(Refer to "How to remove the dust cover.")**
2. Remove the tonearm position detecting circuit board setscrew **(Fig. 10: ㊱)**.
3. Release the each 2 claws and remove the tonearm position detecting circuit board and the rest switch (S601). **(Fig. 10: Ⓐ Ⓑ)**

• How to remove the tonearm

1. Separate the upper cabinet and lower cabinet. **(Refer to "How to separate the upper cabinet and lower cabinet.")**
2. Remove the tonearm cover setscrew **(Fig. 10: ㊲ ~ ㊴)** and tonearm cover.
3. Unsolder the 5 lead wires **(Fig. 11)**.
4. Remove the tonearm setscrew **(Fig. 12: ㊵)**.

• How to remove the cueing control ass'y

1. Remove the tonearm cover. **(Refer to "How to remove the tonearm" Item 2)**
2. Unsolder the 2 lead wires from the cueing plunger **(Fig. 11)**
3. Remove the 2 cueing control ass'y setscrews **(Fig. 11: ㊶,㊷)**, and the cueing control ass'y can be removed in the direction of the arrow Ⓐ.

• How to remove the tonearm position indicator board

1. Remove the dust cover and tonearm cover. **(Refer to "How to remove the dust cover" and "How to remove the tonearm Item 2)**
2. Unsolder the 2 lead wires from the indicator **(Fig. 11)**
3. Remove the tonearm position indicator board setscrew **(Fig. 11: ㊸)**.

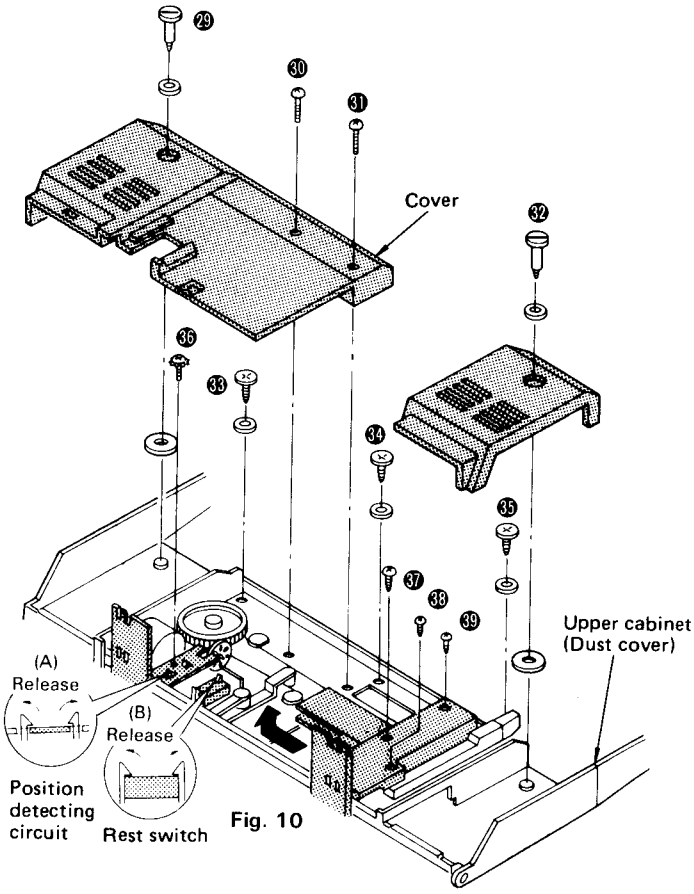


Fig. 10

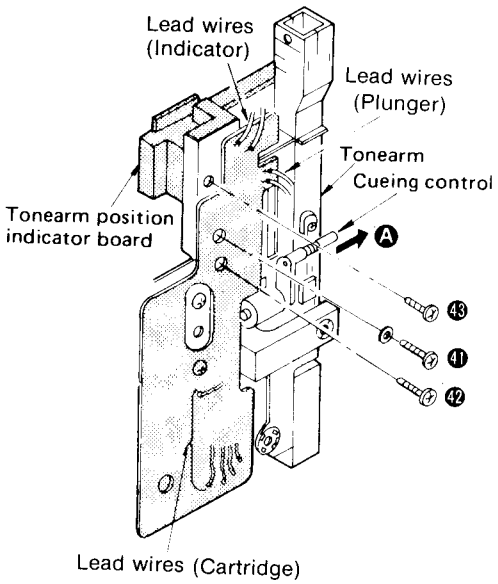


Fig. 11

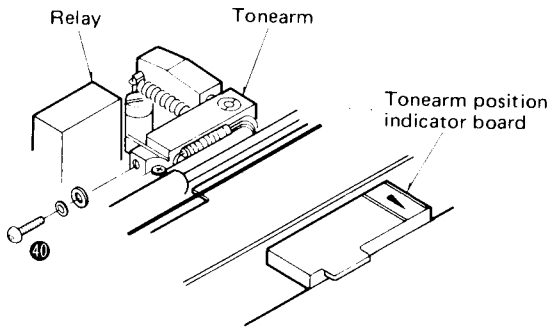


Fig. 12

- **How to remove the Hall element**

1. Remove the turntable platter.
2. Remove the terminal solder by use of solder sucker.
3. Hold the Hall element with a tweezers and remove it while touching the soldering iron to the terminal. (**Fig. 13**)

   Note: Fit the Hall element with the part No. print up. The reverse in terminal position is allowable provided that the printed side is up.

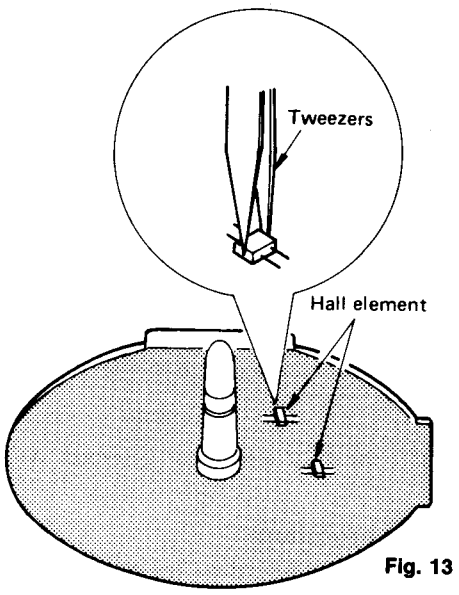


Fig. 13

- **How to remove the cabinet (Reset) switch**

1. Remove the bottom board (**Refer to "How to remove the bottom board."**)
2. Completely open the upper cabinet.
3. Remove the cabinet switch setscrew (**Fig. 14 : ㊹**).

   Note: When fitting the cabinet switch, be sure to open the upper cabinet.

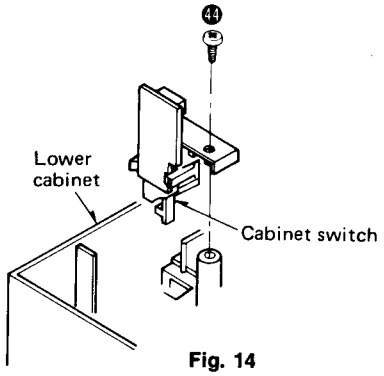


Fig. 14

■ HOW TO SET THE TONEARM DRIVE ROPE

Set the rope according to the following procedure.

1. Open the upper cabinet and remove the cartridge.
2. Remove the arm motor cover and tonearm cover.
3. Detach the arm drive wheel "C" ring ㊸ and washer ㊶, and remove the drive wheel. (**See Fig. 15**)
4. Turn over the arm drive wheel and set the rope in the order of 1 ~ 2. (**Fig. 16**)
5. Holding the rope set over the arm drive wheel with the hand, set the tope over the wheels in the order of 3 ~ 5 in **Fig. 17**.
6. After setting the rope, rotate the worm gear by hand until the tonearm matches the rope connector.
7. Rotate the worm gear by hand and check that the tonearm operates, and then fit the washer ㊶ and "C" ring ㊸ in place.

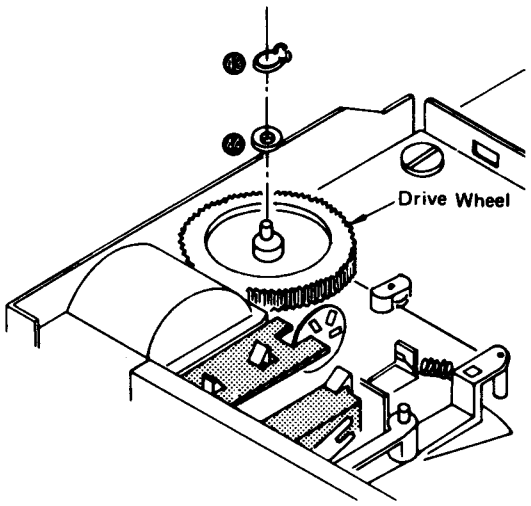


Fig. 15

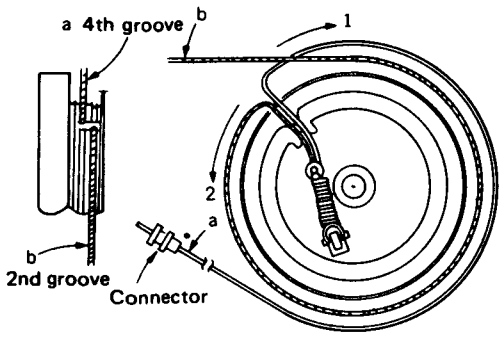


Fig. 16

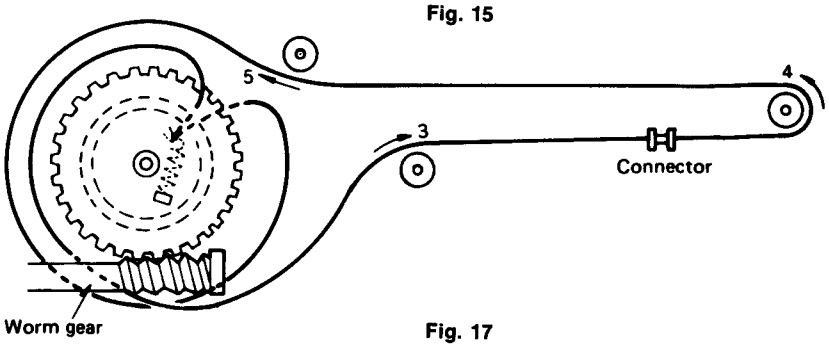


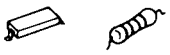
Fig. 17

■ HOW TO REPLACE CHIPS

(Resistor, capacitor and jumper)

• Removing procedure

1. Completely remove the solder from both ends of the chip by use of solder suker.
2. Touch the soldering iron to the end of the chip as shown in Fig. **18**, then turn the tweezers in the direction of the arrow.



Witout color cord With color cord

Chip resistor

Do not re-use chip resistor or capacitor without color cord.

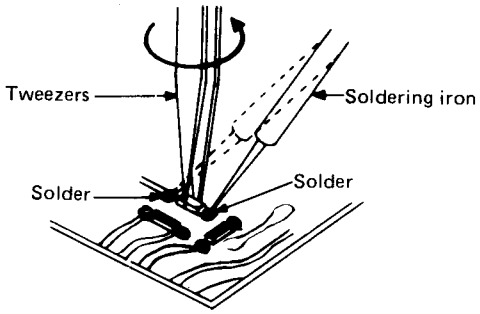


Fig. 18

• Replacing procedure

1. Place solder on the foil where the chip is fitted.
   Then solder the chip by holding the soldering iron as shown in Fig. **19**.

Note:

1. If the chip jumper is removed, connect a coated lead wire to the part. (See Fig. **20**).
   Chip jumper is marked with "J" on the printed circuit board.

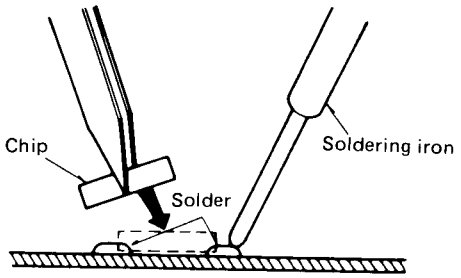


Fig. 19

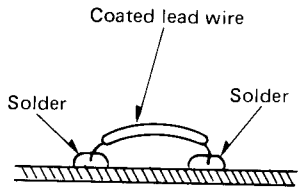


Fig. 20

• Note for replacing chips

1. Do not heat the chip more than 3 seconds.
2. Do not rub the electrode against the chip.
3. Use the tweezers with care not to damage the surface of the chip.
4. It is desirable to use a pencil type soldering iron. And use soldering iron less than 60W.

■ MEASUREMENTS AND ADJUSTMENT

• Instruments used

1. Oscilloscope
2. DC voltmeter
3. 30cm record
4. Screwdriver

Step	Item	Preparations for adjustment	Adjusting portion	Adjusting method
1	**Start position**	1. Put 30cm record on turntable mat and close upper cabinet. 2. Turn the power switch on. 3. Push the "Start" switch.	Start position adjusting screw. **(Fig. 21)**	1. Turn the start position adjusting screw. If it descends between tunes, turn the screw clockwise. If it descends outside the disc, turn the screw counterclockwise.
2	**Clock frequency**	1. Connect lead wire with clip to IC 301 pin ⑦ and pin ㉗ of operation circuit board. 2. Connect oscilloscope to IC 301 pin ⑥.	**VR 301 (Fig. 22)**	1. Set power switch to "on". 2. Adjust VR 301 so that the cycle output waveform is 30 μsec ± 1 μsec. **(Fig. 23)**

Step	Item	Preparations	Parts adjusted	Procedure
3	**Tonearm offset angle**	1. Open the upper cabinet and hold the cabinet switch with tape. 2. Close the upper cabinet.	Adjusting screw **(Fig. 24)**	1. Turn the power switch on and push the start switch to shift the tonearm inward. 2. Open the upper cabinet. 3. Turn the adjusting screw so that the arm center matches the V-groove of the lift bar.
4	**Servo gain and offset voltage**	1. Open the upper cabinet and hold the cabinet switch with the tape. 2. Close the upper cabinet. 3. Connect the DC voltmeter to CN301 terminal ③ and ground terminal. 4. Remove the Label of the tonearm cover.	VR501 (Servo gain) P.C.B. (Offset voltage) **(Fig. 25)**	1. Turn the power switch on and push the start switch to shift the tonearm inward. 2. Open the upper cabinet. 3. Completely shift the tonearm to the right. Then, adjust VR501 so than the voltage is 3.6V. **(Servo gain)** 4. Set the tonearm to the center and make sure that the output voltage is 1.8V. 5. If the voltage is not 1.8V, loosen the printed circuit board screw and move the board to the right or left with a screw-driver so that the output voltage becomes 1.8V. After the adjustment, tighten the printed circuit board screw. **(Offset adjustment)**

• Adjustment points

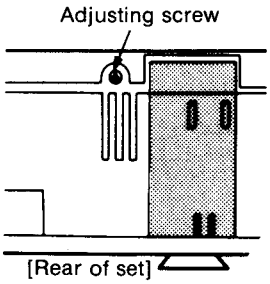


Fig. 21

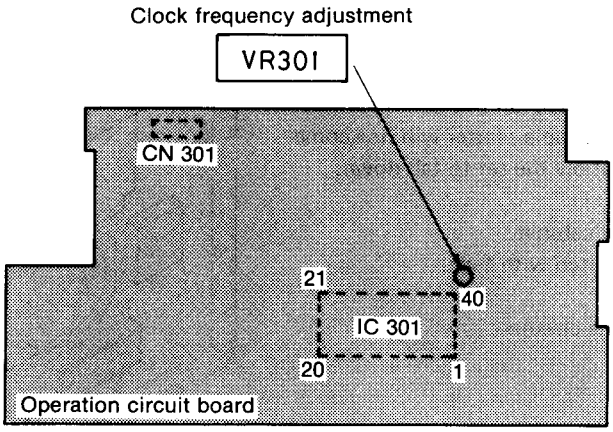


Fig. 22

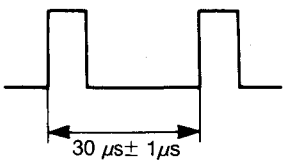


Fig. 23

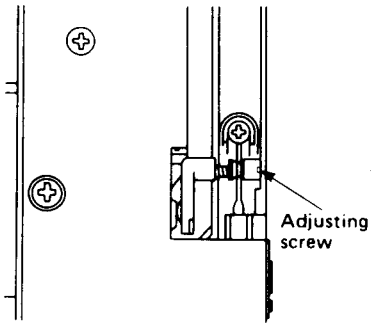


Fig 24

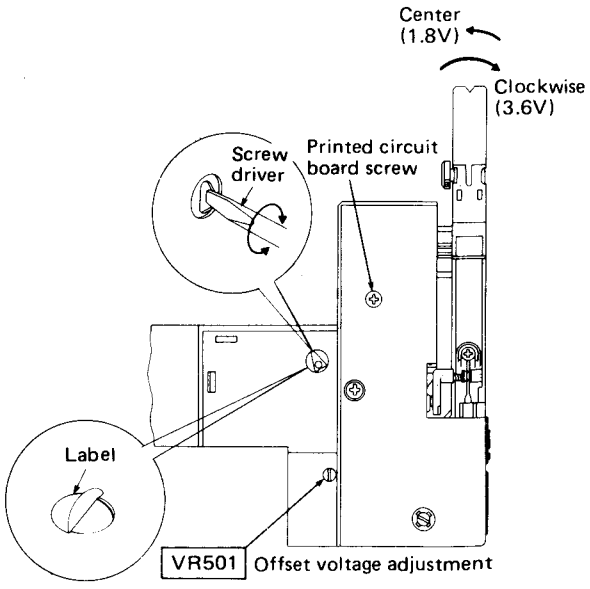


Fig. 25

■ TROUBLE SHOOTING

1. How to use the repair table (Fig. 26)

① Remove the bottom board.
② Remove the operation circuit board and connect the P.C.B. ground terminal to the chassis (Stator frame.)
③ Put the unit on the repair table.
④ Fit the turntable platter and put on the turntable mat.
⑤ Put on the record and check the circuits from under the unit.

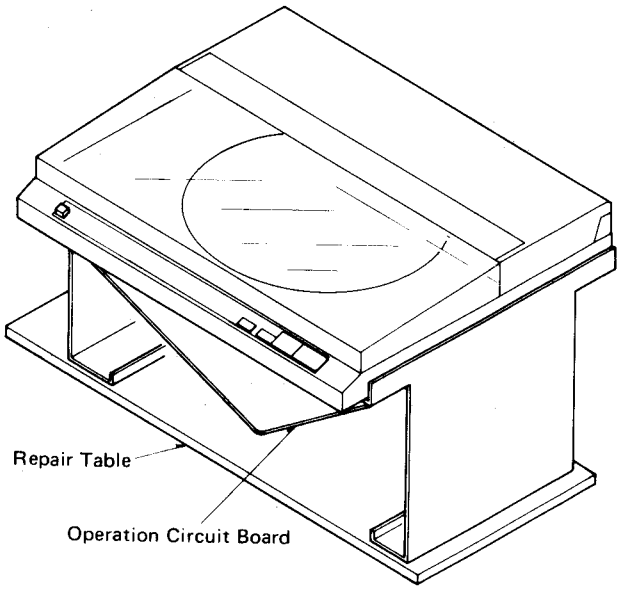


Fig. 26

2. How to raise the set (Fig. 27)

Note: Turntable platter is not fixed on the center spindle. Take care so that the turntable platter will not come loose. Also, take care allow the set to fall down.

① Remove the bottom board.
② Completely open the upper cabinet.
③ Hold the cabinet (Reset) switch with tape.
④ Fit the turntable platter.
⑤ Raise the unit and check the circuits.

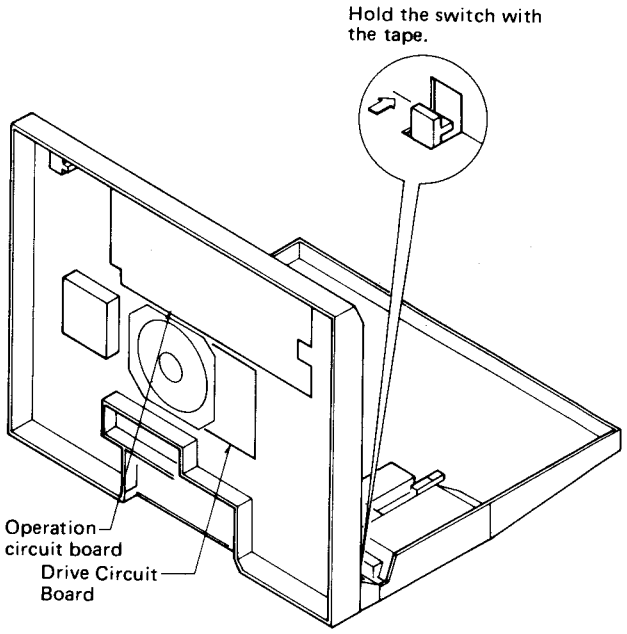


Fig. 27

3. How to turn over the set (Fig. 28)

Note: This purpose is to check the voltage of each circuit during stop of the turntable.

① Remove the turntable platter and turn over the unit.
② Remove the bottom board.
③ Turn the power switch "on" and check the voltage.

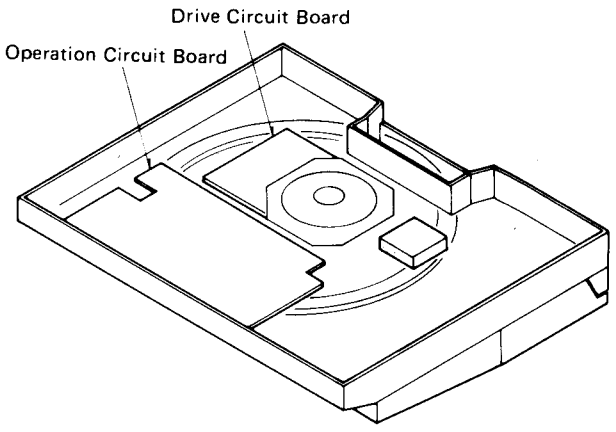


Fig. 28

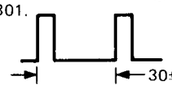
Turntable does not rotate

Power source circuit
1. AC 18V between BT1 terminals ③ and ④.
2. DC voltage of regulator IC (IC1). ① 20V, ② 0V, ③ 11.8V
3. DC voltage of regulator transistor (Q1). ⓒ 10V, Ⓑ 5.6V, Ⓔ5V
4. DC voltage at terminal ① of IC101. (11.8V)
5. DC voltage at terminal ⑱ of IC201. (8.5V)

NO → 1.Power transformer, AC cord 2.IC1, S1, D1, C1~C5 3.Q1, D2 R1~R3 4.IC101 5.IC201

YES

Clock frequency
1. Connect IC301 terminal ⑦ and terminal ㉗.
   Waveform of terminal ⑥ IC301 IC301.



NO → IC301 VR301 C301 R310

YES

Push start switch, (S301).

Start/stop circuit
1. DC voltage at terminal ⑧ of IC301. (5V)
2. DC voltage at terminal ㉖ of IC301. (0V)
3. DC voltage at terminal ⑩ of IC201. (0V)
4. DC voltage at terminal ② of IC101. (0.6V)

NO → 1. S301, 2. IC301 3. IC201 4. IC101

YES

Drive coil and Hall element
1. Conduction check of drive coils. (About 33Ω)
2. DC voltage of Hall elements.

	①	②	③	④
Voltage	3.8	7.6	3.8	0

NO → 1. Drive coil 2. H101,H02, IC101

YES

Drive circuit (Stop)
1. DC voltage at each terminal of IC101

	②	③	④~⑩	⑪
Voltage	0	12	0	6

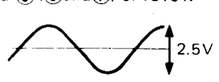
NO → IC101

YES

Drive circuit (Rotation)
1. DC voltage at each terminal of IC101.

	②	⑨	⑩	⑪
Voltage	0.8	4.9	4.9	4.7

2. Waveform between terminal ④ and ⑤ (⑥and⑦) of IC101.



NO → IC101

Arm motor does not rotate

1. Measurement of tonearm drive rope.
2. Measurement of tonearm drive belt.

NO → Rope and belt dislocation

YES

Arm motor control circuit
1. DC voltage at each terminal of IC301.

	⑮	⑯	⑰	⑱
Stop	5	5	1.7	1.7
Lead-in	0	5	0	1.7
Return	5	0	1.7 •	0

2. DC voltage at each terminal of IC401.

	①	②	③
Stop · Lead-in	1.3	3.8	3.8
Return	11	2.2	3.8

3. DC voltage at each terminal of IC401.

	⑤	⑥	⑦
Stop · Return	3.6	3.8	1.3
Lead-in	3.6	2.2	11

4. DC voltage of Q401 ~ Q404.

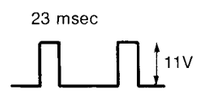
	Q401		Q403	
	Ⓑ	Ⓔ	Ⓑ	ⓒ
Stop	0.7	0.3	1.0	0.3
Return	9.7	8.0	0	9.0

	Q402		Q404	
	Ⓑ	Ⓔ	Ⓑ	ⓒ
Stop	0.7	0	1.0	0.3
Lead-in	9.7	8.0	0	9.0

NO → 1. IC301 2. IC401 3. IC401 4. Q401~404 RF1

Lead-in return defective with 17cm record

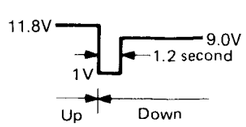
Arm position detection circuit
1. Waveform of IC401 terminal ⑨ during arm motor rotation.



NO → PC601 IC401

Cueing down/up does not work

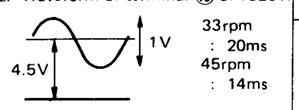
Cueing control circuit
1. DC voltage of IC301 terminal ②. (During cueing and down 0.8V.)
2. DC voltage of IC301 terminal ③. (Only during cueing down 1.6V.)
3. DC voltage of Q304 ⓒ



NO → 1. IC301 2. Q303, 304 Plunger

Unstable rotation

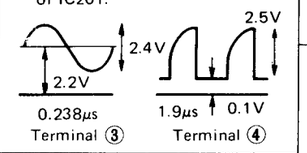
FG amplifier circuit
1. Conduction check of FG coil.
2. Waveform of terminal ⑮ of IC201.



NO → FG coil IC201 R203, 205 C201~203

YES

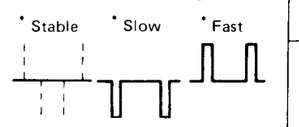
Quartz oscillator circuit
1. Waveform of terminals ③ and ④ of IC201.



NO → X201 IC201 C204~205

YES

Speed control circuit
1. Waveform of terminal ⑭ of IC201.

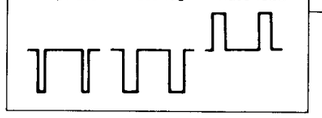


NO → IC201 IC101

YES

Phase control circuit
1. Waveform of terminal ⑬ of IC201.

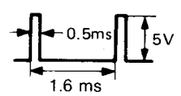
*In-phase *Phase lag *Phase lead



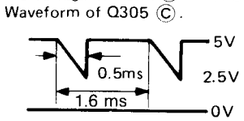
IC201 IC101

Offset angle does not detection

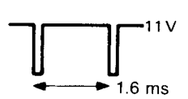
Offset error angle detection circuit
1. Waveform of terminal ⑥ of IC301. (During cueing down)



2. DC voltage of Q305 Ⓑ. . . (1.8V)
3. Waveform of Q305 ⓒ.



4. Waveform of terminal ⑧ of IC401.



NO → 1.IC301 2.Q305, PC501 3.Q305, 306 C302 4 IC401

■ FUNCTION OF TERMINAL (MN1421FPC)

* These are the basic functions of MN1421FPC. Therefore, some terminals are not necessary of circuit functions may be partially changed depending on the purposes.

No.	Mark	Description
1	VSS	Ground terminal
2	CO9	Cueing control terminal ("H" during cueing and cueing down)
3	CO8	Cueing control terminal ("H" only during cueing down — about 1 sec.)
4 5 6	CO7 CO6 CO5	Key scan output terminal
7 8 9 10	Ai3 Ai2 Ai1 Ai0	Key scan input terminal
11 12	Bi3 Bi2	Auto size and speed select terminal Terminal ⑪, ⑫ "L" → 30cm record ·33rpm ⑪ "L" ⑫ "H" pulse → 17 cm record · 45rpm
13	Bi1	Rest position detecting terminal ("H" when tonearm is at rest position)
14	Bi0	Record detection terminal ("H" when record is present)
15 16 17 18	EO0 EO1 EO2 EO3	Tonearm drive motor control terminal (Arm servo)
19	TEST	Test terminal (not used, connected to ground)
20	RST	Reset terminal (micom is reset at "L")
21	SNS0	Offset angle detection input terminal
22	SNS1	Arm position detecting input terminal
23	DO0	Turntable speed select terminal ("H" in 45rpm; "L" in 33rpm)
24	DO1	Repeat indicator terminal (ON at "L")
25	DO2	Synchro-rec on/off terminal
26	DO3	Turntable start/stop select terminal ("L" at start; "H" at stop)
27	VDD	Power supply (+5V)
28	OSC	Oscillation circuit (Clock frequency is adjusted to 30μs ± 1μs)

■ RESISTORS AND CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. This "Ⓢ" mark is service standard parts and may differ from production parts.
4. Unless otherwise specified. All resistors are in OHMS (Ω) K = 1000Ω, M = 1000kΩ All capacitors are in MICROFARADS (μF) P = 10^{-6} μF

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

ERG	1	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : ±5%
ERX : Metal Film	1 : 1W	G : ±2%
ERTD : Thermister		

ERD2FCG□□□ ⟶ Fuse type carbon (1/4W)
ERD10TLJ □□□ ⟶ Chip type carbon (1/8W)
ECUV1H □□□ ⟶ Chip type ceramic

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	1A : 10V	1H : 50V DC	J : ±5%
ECEB : Electrolytic	1C : 16V	2H : 500V DC	K : ±10%
ECKD : Ceramic	1E : 25V	1 : 100V	Z : +80%, −20%
ECQM : Polyester	1V : 35V		P : +100%, −0%
	1H : 50V		M : ±20%
	50 : 50V		

■ REPLACEMENT PARTS LIST

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "Ⓢ" mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the columns of description stand for quantity per set.

Areas
*[M] is available in U.S.A.
*[MC] is available in Canada.

Ref. No.	Part No.	Value
RESISTORS		
RF1 ⚠	ERD2FCG180	18
R1	ERDS2TJ681	680
R2	ERDS2TJ221	220
R103	ERD10TLJ104U	100K
R104	ERX1ANJ2R7	2.7
R105	ERD10TLJ270U	27
R201	ERD10TLJ393U	39K
R202	ERD10TLJ394U	390K
R203	ERD10TLJ680U	68
R204	ERD10TLJ151U	150
R205	ERD10TLJ223U	22K
R207	ERD10TLJ102U	1K
R208	ERD10TLJ680U	68
R301	ERDS2TJ562	5.6K
R302	ERDS2TJ331	330
R303	ERDS2TJ182	1.8K
R304	ERDS2TJ562	5.6K
R305	ERDS2TJ562	5.6K
R306	ERDS2TJ331	330
R307	ERDS2TJ331	330
R308	ERDS2TJ562	5.6K
R309	ERDS2TJ332	3.3K
R310	ERDS2TJ332	3.3K
R311	ERDS2TJ102	1K
R312	ERDS2TJ333	33K
R313	ERDS2TJ333	33K
R314	ERDS2TJ333	33K
R315	ERDS2TJ333	33K
R316	ERDS2TJ332	3.3K
R317	ERDS2TJ332	3.3K
R318	ERDS2TJ332	3.3K
R319	ERDS2TJ332	3.3K
R320	ERDS2TJ272	2.7K
R321	ERDS2TJ272	2.7K
R322	ERDS2TJ272	2.7K
R323	ERDS2TJ272	2.7K
R324	ERDS2TJ271	270
R325	ERDS2TJ821	820
R326	ERDS2TJ222	2.2K
R327	ERDS2TJ272	2.7K
R328	ERDS2TJ331	330
R329	ERDS2TJ272	2.7K
R330	ERDS2TJ272	2.7K
R331	ERDS2TJ272	2.7K
R332	ERDS2TJ103	10K
R333	ERDS2TJ223	22K
R334	ERDS2TJ562	5.6K
R335	ERDS2TJ222	2.2K
R336	ERDS2TJ224	220K
R337	ERDS2TJ104	100K
R338	ERDS2TJ103	10K
R339	ERDS2TJ333	33K
R340	ERDS2TJ562	5.6K
R341	ERDS2TJ222	2.2K
RF401 ⚠	ERD2FCG330	33
R401	ERDS2TJ683	68K
R402	ERDS2TJ683	68K
R403	ERDS2TJ122	1.2K
R404	ERDS2TJ472	4.7K
R405	ERDS2TJ681	680
R406	ERDS2TJ272	2.7K
R407	ERDS2TJ152	1.5K
R408	ERDS2TJ102	1K
R409	ERDS2TJ224	220K
R410	ERDS2TJ152	1.5K
R411	ERDS2TJ102	1K
R412	ERDS2TJ224	220K
R413	ERDS2TJ101	100
R414	ERDS2TJ471	470
R415	ERDS2TJ101	100
R416	ERDS2TJ471	470
R501	ERDS2TJ331	330
R502	ERDS2TJ561	560
R503	ERDS2TJ820	82
R504	ERTD2FFK251S	250
R601	ERDS2TJ681	680
CAPACITORS		
C1 ⚠	ECQM1223KZ	0.022
C2 ⚠	ECQM1223KZ	0.022
C3 ⚠	ECQM1223KZ	0.022
C4 Ⓢ	ECEB1VU102	1000
C5 Ⓢ	ECEA1CU330	33
C101 Ⓢ	ECEA1CU330	33
C102 Ⓢ	ECEA50ZR22	0.22
C103 Ⓢ	ECQM1H274JZ	0.27
C105 ⚠ Ⓢ	ECAEA1CN470S	47
C106 ⚠ Ⓢ	ECAEA1CN470S	47
C107 Ⓢ	ECEA50Z1	1
C201 Ⓢ	ECEA1AU470	47
C202 Ⓢ	ECEA50ZR22	0.22
C203 Ⓢ	ECQM1H683JZ	0.068
C204	ECUV1H121JCM	120P
C205	ECUV1H1330JCM	33P
C206	ECUV1H101JCM	100P
C207 Ⓢ	ECEA1AU470	47
C208 Ⓢ	ECEA1AU470	47
C301 Ⓢ	ECEA0JU470	47
C302	ECFR1H104ZF	0.1
C303 Ⓢ	ECCD1H680K	68P
C304	ECFR1H104ZF	0.1
C305 Ⓢ	ECQM1H104JZ	0.1
C306 Ⓢ	ECEA1HU3R3	3.3
C307 Ⓢ	ECKD1H102KB	0.001
C308 Ⓢ	ECKD1H102KB	0.001
C401 Ⓢ	ECEA1CU330	33
C402 Ⓢ	ECQM1H223JZ	0.022
C403 Ⓢ	ECQM1H223JZ	0.022
C404 Ⓢ	ECEA0JU470	47
C405 Ⓢ	ECEA0JU470	47
C501 Ⓢ	ECEA1CU101	100
C601	ECFB1B104ZRM	0.1

Ref. No.	Part No.	Value
INTEGRATED CIRCUIT		
IC1	SVIUPC7812H	Regulator, 12V
IC101	AN6638	Turntable Drive
IC201	AN6683	Turntable Control
IC301	MN1421FPC	Micro Computer
IC401	AN6554	Comparator
TRANSISTORS		
Q1	2SD638	Regulator, 5V
Q301	2SD636	Switching
Q302	2SD892	Switching
Q303	2SD636	Offset Error Angle Det.
Q304	2SB641	Offset Error Angle Det.
Q305, 306	2SD636	Switching
Q401,402 Ⓢ	2SD973	Tonearm Motor Control
Q403, 404	2SD892	Tonearm Motor Control
DIODES		
D1 ⚠	SVDS1RBA20Z	Rectifier
D2	MA4056	5.6V Zener
D301	SVDGL-9PR2F1	Cueing Up Indicator
D302, 303 304	MA165	Switching
D305	MA4062	6.2V Zener
D306	SVDGL-9PR2F1	Repeat Indicator
D501 Ⓢ	MA162A	Switching
D502	SVDPR3432S	Tonearm Indicator

Ref. No.	Part No.	Value
SWITCHES		
S1 ⚠	SFDSC05N08	On/Off (Power)
S301~304	EVQQJ104K	Start, Stop, Cueing, Repeat
S305	SFDSHSW0699	Speed Selector
S306	SFDSD05N01	Record Detection
S307	SFDSD05N01	Cabinet (Reset)
S601	SFDSD2MSL-C	Ret Position Detection
S701	SFDSC05N02	Record Size Detection
CRYSTAL		
X201	SVQSH41TR	4.193MHz OSC
PHOTO INTERRUPTERS		
PC501	ON1262	Offset Sensor
PC601	ON1261	Tonearm Position Sensor
VARIABLE RESISTORS		
VR301	EVN61AA00B54	Clock Frequency Adjustment, 50kΩ (B)
VR501	EVNK6JA00B14	Servo Gain Adjustment, 10kΩ (B)
RELAY		
RL501	SFDYAW6945	Muting Relay

Ref. No.	Part No.	Value
POWER TRANSFORMER		
T1 [M] ⚠	SLT48DTL3A	Power Source
T1 [MC] ⚠	SLT48DT11C •	Power Source
FUSE		
F1 [MC]only ⚠	XBA2F08NU100	250V, 800mA

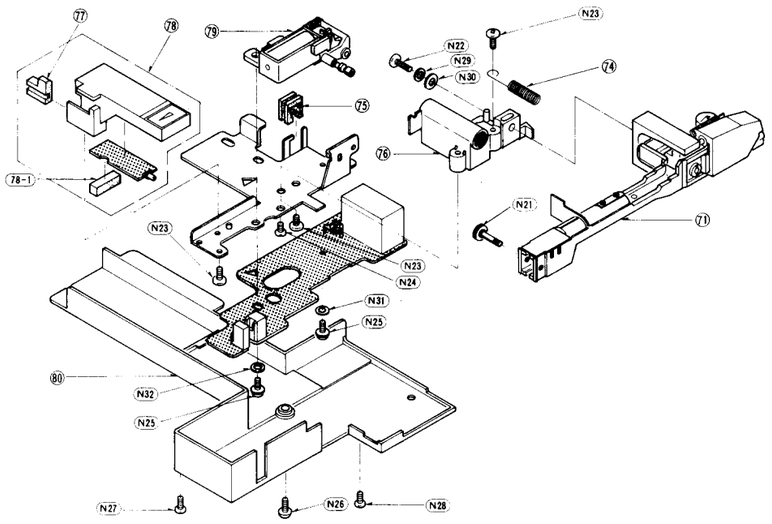
Ref. No.	Part No.	Value	
CABINET AND CHASSIS PARTS			
1	SFWEC06N01	Adaptor, 45r.p.m	(1)
2	SFQAC06N01	Spring, 45r.p.m. Adaptor	(1)
3	SFTGQ05N01	Turntable Mat	(1)
4	SFTEQ05N01	Turntable Platter	(1)
5	SFTMC07-01E	Rotate Magnet Ass'y	(1)
6 [M]	SFNNQL5M01	Name Plate	(1)
6 [MC]	SFNNQL5C01	Name Plate	(1)
7	SFATQ15N01A	Hinge (Right Side)	(1)
8	SFATQ15N02A	Hinge (Left Side)	(1)
9	SFKKQL5N02	Ornament Plate	(1)
10	SFACQL5N01	Cabinet	(1)
11	SFUMC05N15	Holder, Rest Switch and Record Detecting Switch	(2)
12	SFQPC05N01	Spring, Reset Switch	(1)
13	SFNZQL5M01	Label, Speed Select	(1)
14	SFUMD05N03	Rod, Speed Select Switch	(1)
15	SFKTQL5N01	Button, Operation	(1)
16	SFKTD05N02	Knob, Speed Select	(1)
17	SFMGQ34N01	Cover, Stator Coil	(1)
18	SFMZC06N01R	Stator Frame Ass'y	(1)
19	SFUMQL5N01E	Lever, Record Detecting	(1)
20	SFUMQ15N03	Holder, L.E.D	(1)
21	SFUPQL5N01	Holder, Operation Button	(1)
22	SFAUL12M01	Bottom Board	(1)
23	SFGAC05N02	Insulator	(4)
24	SFQCC05N01	Spring, Insulator	(4)
25	SFGCC05N02	Cushion Rubber, Power Transformer	(2)
26	SFGZC05N03	Cushion rubber, Power Transformer	(1)
27	SFKTQ15N03	Knob, Power Switch	(1)
28	SFXJBL3N02E	Shaft Ass'y Power Switch	(1)
29	SFUMQ15N04	Stopper, Operation Circuit Board	(1)
30	SFQABL3N02	Spring, Power Switch Shaft	(1)
31	SFUMBL3N05	Holder, Power Switch Shaft	(1)
32	SFADD05N01E	Dust Cover Ass'y	(1)
32-1	SFAD130-02	Cushion Rubber, Dust Cover	(2)
33	SFKKQL5N01	Record Groove Scale Plate	(1)
34	SFGCC05N03	Rubber Spacer	(3)
35	SFGCD05N01	Rubber Spacer	(2)
36	SFGCC05N06	Rubber Spacer	(2)
37	SFUZC05N03	Latch, Lead Wires Holder	(1)
38	SFUMC05N20	Holder, Lead Wires	(1)
39	SFUKD05N01A	Base, Tonearm	(1)
40	SFUMC05N17	Wheel, Tonearm Drive	(1)
41	SFUMC05N02A	Rest Switch Ass'y	(1)
42	SFUMQL5N02A	Worm Gear Ass'y	(1)
43	SFGBC10-01	Belt, Tonearm Drive Motor	(1)
44	SFMHC05N01E	Tonearm Drive Motor Ass'y	(1)
45	SFUZC05N01	Rod, Rest Switch	(1)
46	SFXJC05N01	Guide Rail, Tonearm	(1)
47	SFGCC05N05	Cushion Rubber, Guide Rail	(2)
48	SFUPC05N03	Bracket, Guide Rail	(1)
49	SFUMD05N02	Cover, Tonearm Base (B)	(1)
50	SFUMD05N01	Cover, Tonearm Base (A)	(1)
51	SFUZC05N02E	Rope Ass'y	(1)
52	SFUMC06N11	Cap, Pulley	(3)
53	SFUMC05N22	Pulley, Rope Ass'y	(3)
54 ⚠	SFDJHSC0491	AC Socket	(1)
55	SFDHC05N02E	Phono Output Jack Ass'y	(1)
56	SFUMQ05N02A	Record Size Detector Ass'y	(1)
57	SFUMC05N11A	Record Detector Ass'y	(1)
58	SFUMC05N06	Guide, Rest Switch Rod	(1)
TONEARM PARTS			
71	SFPAM00501A	Tonearm Ass'y	(1)
74	SFPSP00503	Spring, Lead Wire	(1)
75	SFPGM00502	Holder, Phono Output Cord	(1)
76	SFPAB00502	Bracket, Tonearm	(1)
77	SFPGM00503	Rubber Spacer	(1)
78	SFPAB00501E	Tonearm Position Indicator Ass'y	(1)
78-1	SFPGM00505	Holder, L.E.D Circuit Board	(1)
79	SFPZB00503E	Lift Solenoid Ass'y	(1)
80	SFPCS00501	Cover, Tonearm Base	(1)

Ref. No.		Part No.	Value	
SCREWS, WASHERS AND NUT				
N1	Ⓢ	XTV3+10BFN	Screw, ⊕ 3×10	20
N2	Ⓢ	XTN3+6BFZ	Screw, ⊕ 3×6	(3)
N3		XTN3+5J	Screw, ⊕ 3×5	(3)
N4		XTW3+10Q	Screw, ⊕ 3×10	(1)
N5	Ⓢ	XTV3+20BFN	Screw, ⊕ 3×20	(5)
N6	Ⓢ	XTV3+20BFZ	Screw, ⊕ 3×20	(2)
N7		SFXGD05N01	Screw	(2)
N8	Ⓢ	XTV3+8BFN	Screw, ⊕ 3×8	(1)
N9		SFXGC05N02	Screw	(3)
N10		SFXGC05N03	Screw	(2)
N11		XTW3+14QFYR	Screw, ⊕ 3×14	(6)
N12	Ⓢ	XTV3+6BFN	Screw, ⊕ 3×6	(4)
N13	Ⓢ	XWC3B	Washer	(1)
N14		XUB3FP	Washer	(1)
N15		SFXW551D2	Washer	(1)
N16		SFGCC05N04	Washer	(3)
N17		SFGCD05N02	Washer	(2)
N18		SFXWC05N07	Washer	(3)
N19		SFXWC06N02	Washer	(1)
N20		XNC3HS	Nut	(5)
N21		SFPEV00502	Screw, Cartridge	(1)
N22	Ⓢ	XSN3+12S	Screw, ⊕ 3×12	(1)
N23	Ⓢ	XTN3+8BFZ	Screw, ⊕ 3×8	(2)
N24	Ⓢ	XTN26+6BFZ	Screw, ⊕ 2.6×6	(1)
N25		XTW26+6JFZ	Screw	(2)
N26	Ⓢ	XTV3+10BFZ	Screw	(1)
N27		XTN2+6JFZ	Screw	(1)
N28		XTN2+4JFZ	Screw	(1)
N29	Ⓢ	XWA3B	Washer, φ3	(1)
N30	Ⓢ	XWG3	Washer, φ3	(1)
N31		XWC26AFY	Washer, φ2.6	(1)
N32		SFPEW00701	Washer	(1)

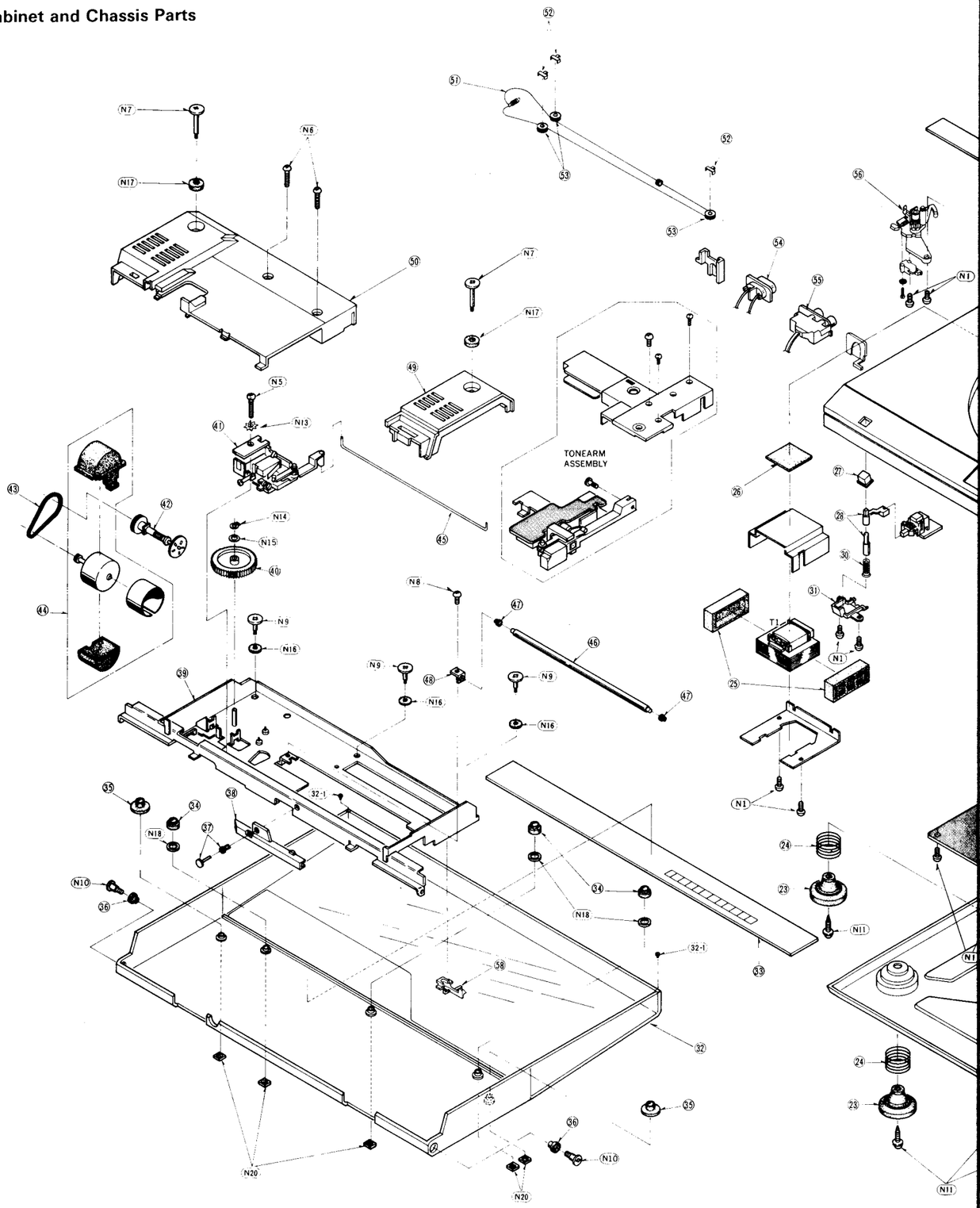
Ref. No.	Part No.	Value	
ACCESSORIES			
A1 [M]	SFNUQL5M01	Instruction Book	(1)
A1 [MC]	SFNUQL5C01E	Instruction Book	(1)
A2	SFDHC05N01	Phono Output Cord	(1)
A3	SFDLC05N01	Ground Wire	(1)
A4 ⚠	SFDAC05M01	AC Cord	(1)
PACKING PARTS			
P1 [M]	SFHPQL5M01	Carton Box	(1)
P1 [MC]	SFHPQL5C01	Carton Box	(1)
P2	SFHHL13R01	Pad, Front	(1)
P3	SFHHL13R02	Pad, Rear	(1)
P4	SFHKC05N01	Clamper, Turntable	(3)
P5	SFHKC05N02	Spacer, Tonearm	(1)
P6	SFHSL13R01	Spacer, Dust Cover	(1)
P7	SFHDQ06N01	Pad, Turntable Mat	(1)
P8	SFYF33B35	Polyethylene Bag, Turntable Mat	(1)
P9	SFYH60×60	Polyethylene Bag, Unit	(1)
P10	SFYH18×17	Polyethylene Bag, Accessories	(1)

■ EXPLODED VIEWS

• Tonearm Parts

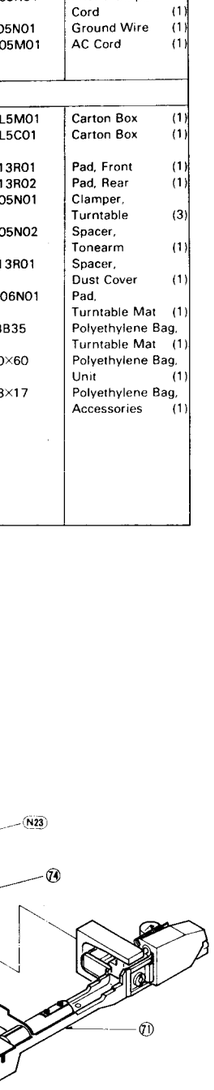


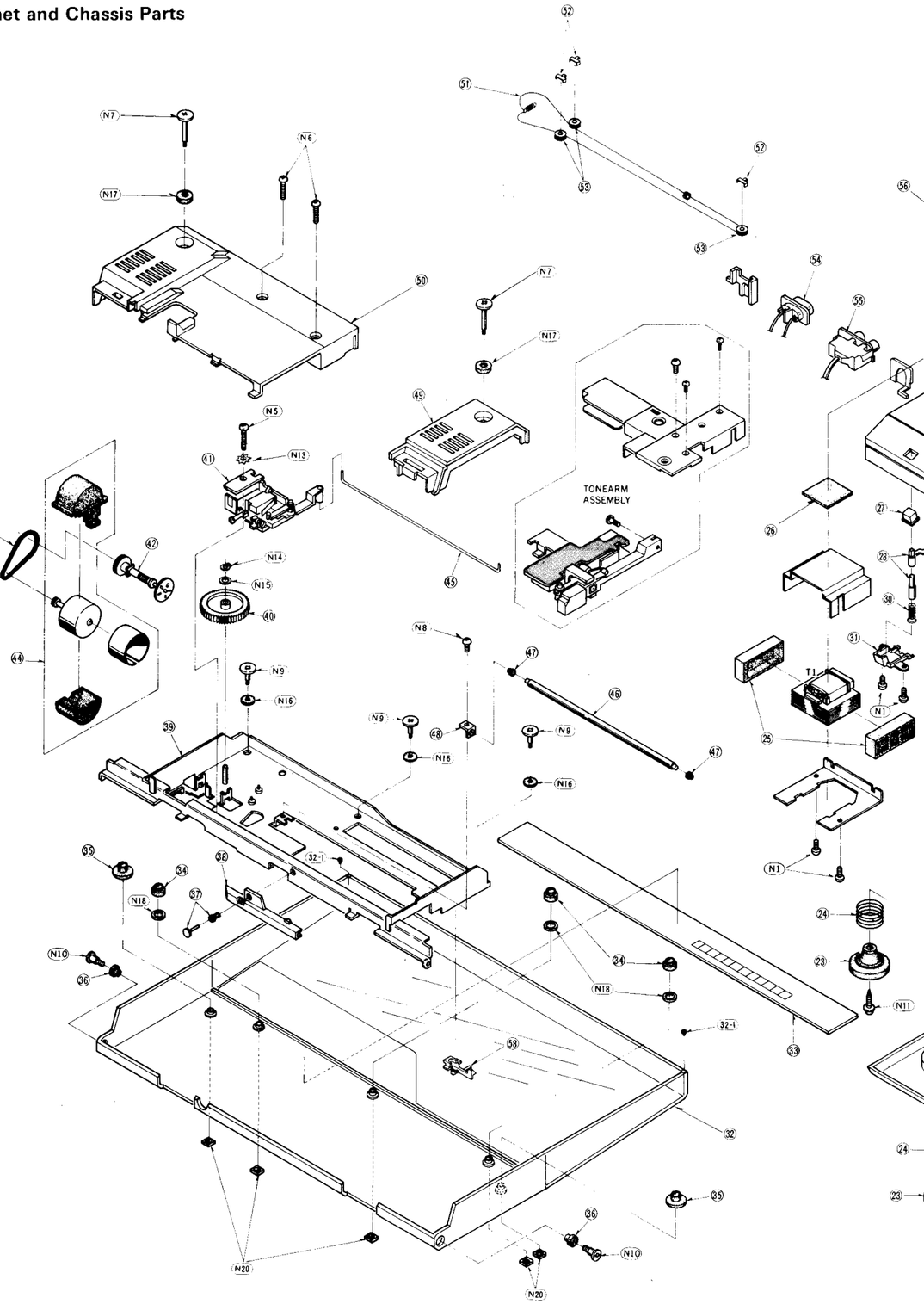
• Cabinet and Chassis Parts

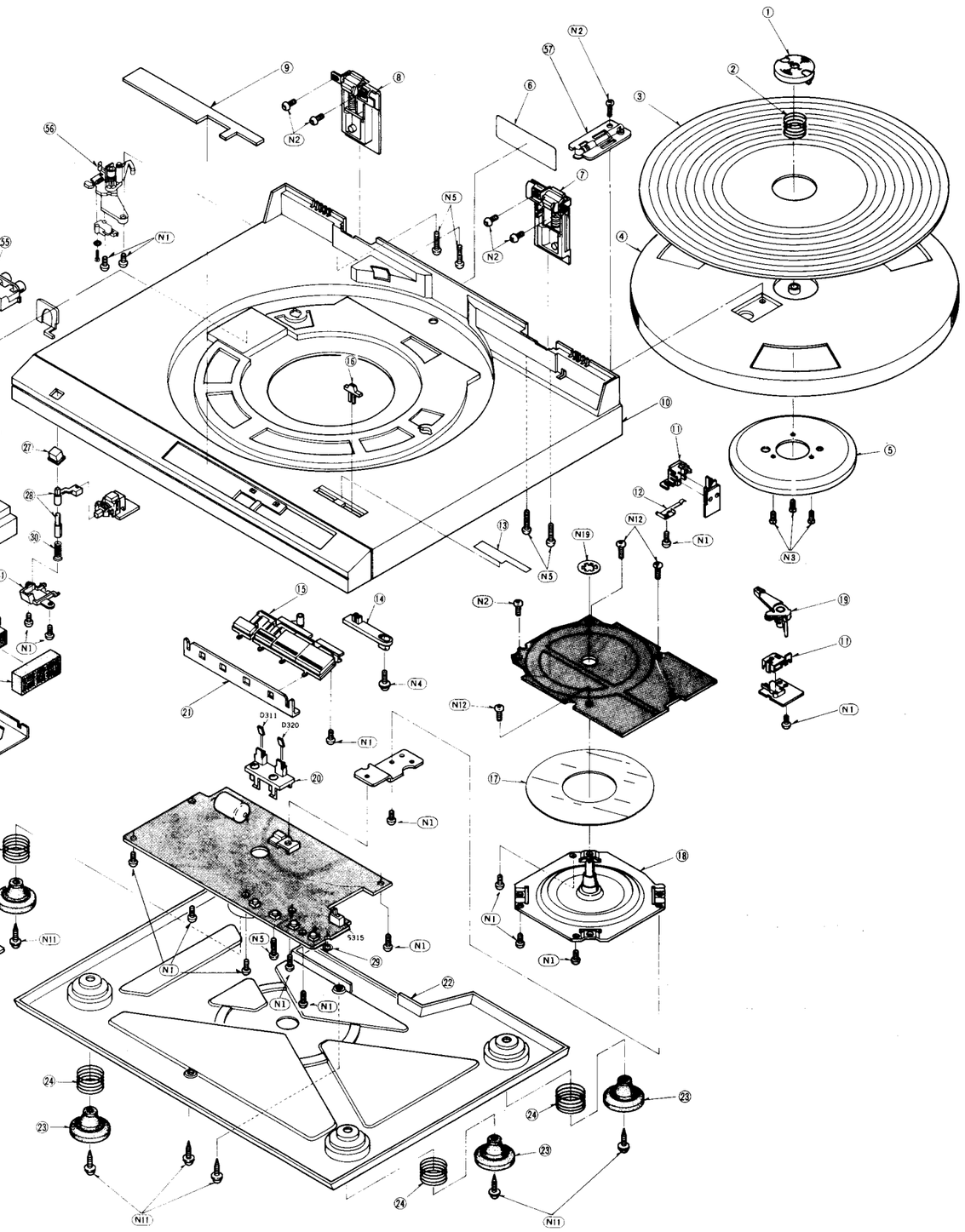


rt No.	Value	
L5M01	Instruction Book	(1)
L5C01E	Instruction Book	(1)
05N01	Phono Output Cord	(1)
05N01	Ground Wire	(1)
05M01	AC Cord	(1)
L5M01	Carton Box	(1)
L5C01	Carton Box	(1)
13R01	Pad, Front	(1)
13R02	Pad, Rear	(1)
05N01	Clamper, Turntable	(3)
05N02	Spacer, Tonearm	(1)
13R01	Spacer, Dust Cover	(1)
06N01	Pad, Turntable Mat	(1)
B35	Polyethylene Bag, Turntable Mat	(1)
0×60	Polyethylene Bag, Unit	(1)
8×17	Polyethylene Bag, Accessories	(1)

• Cabinet and Chassis Parts

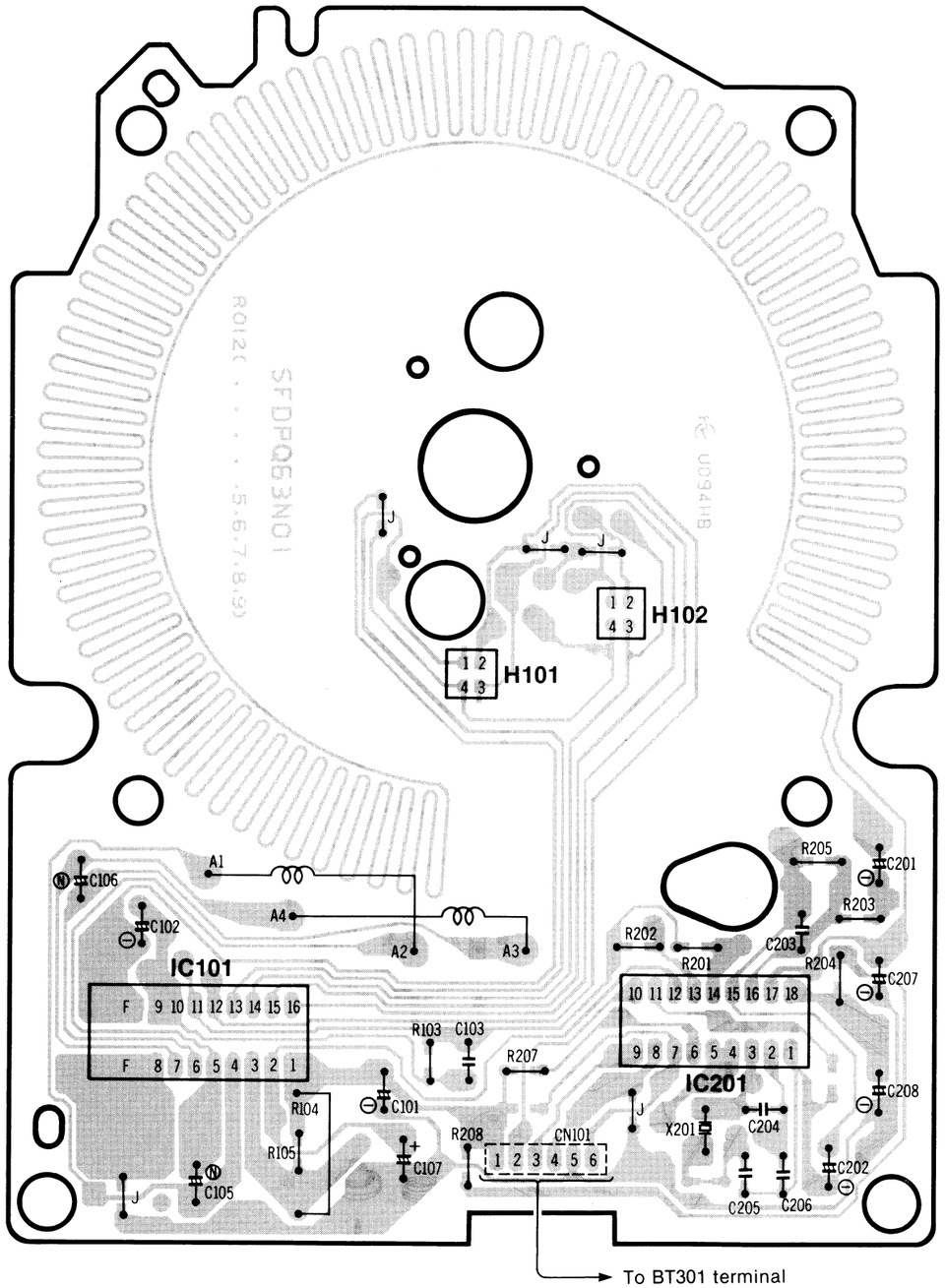


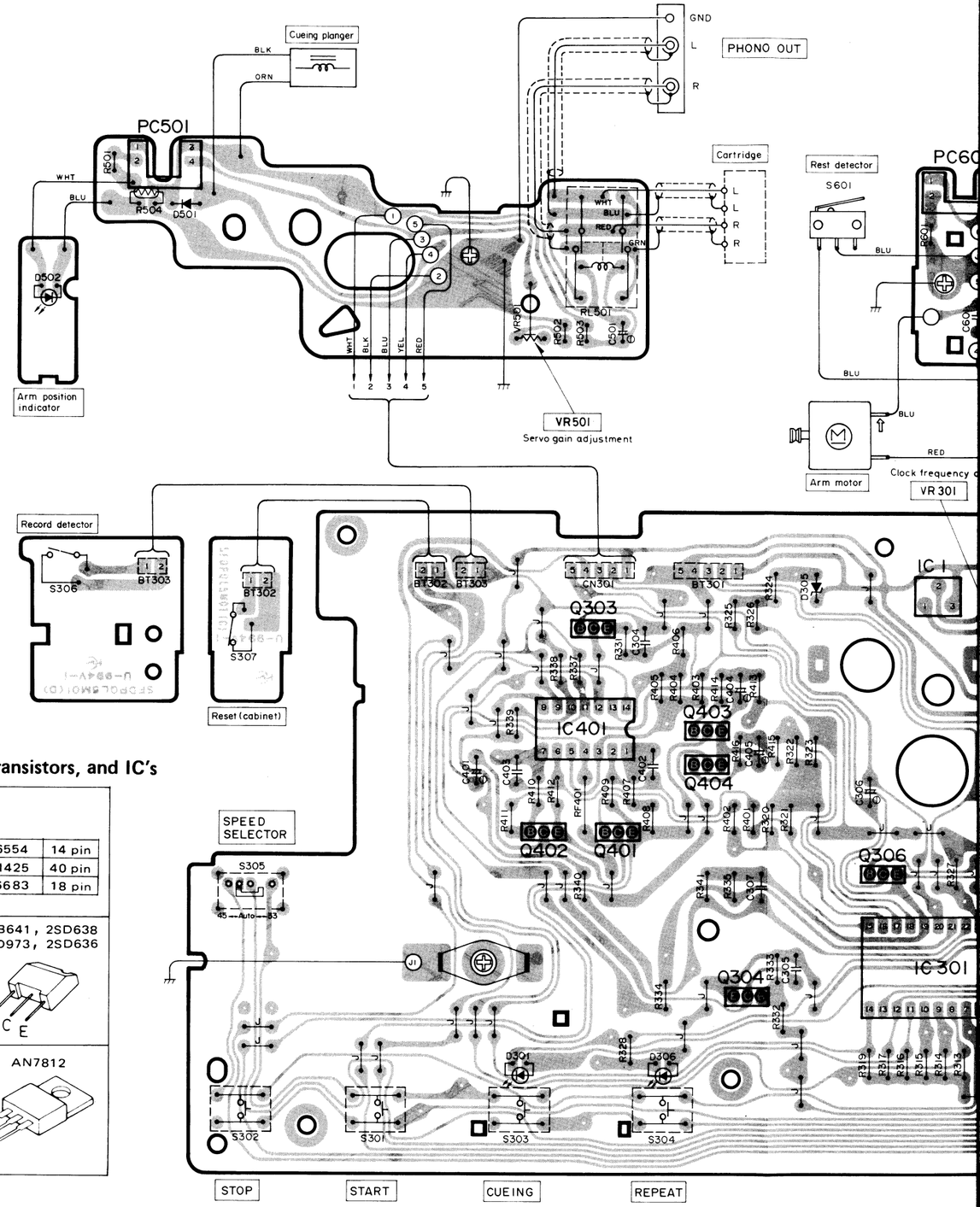




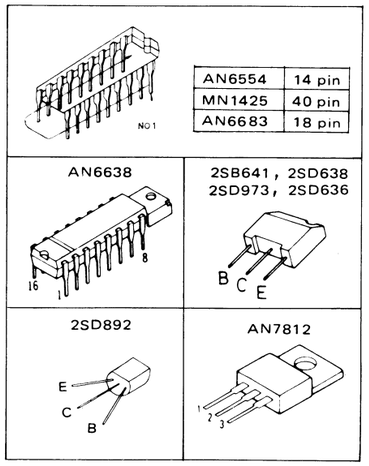
15 16 17

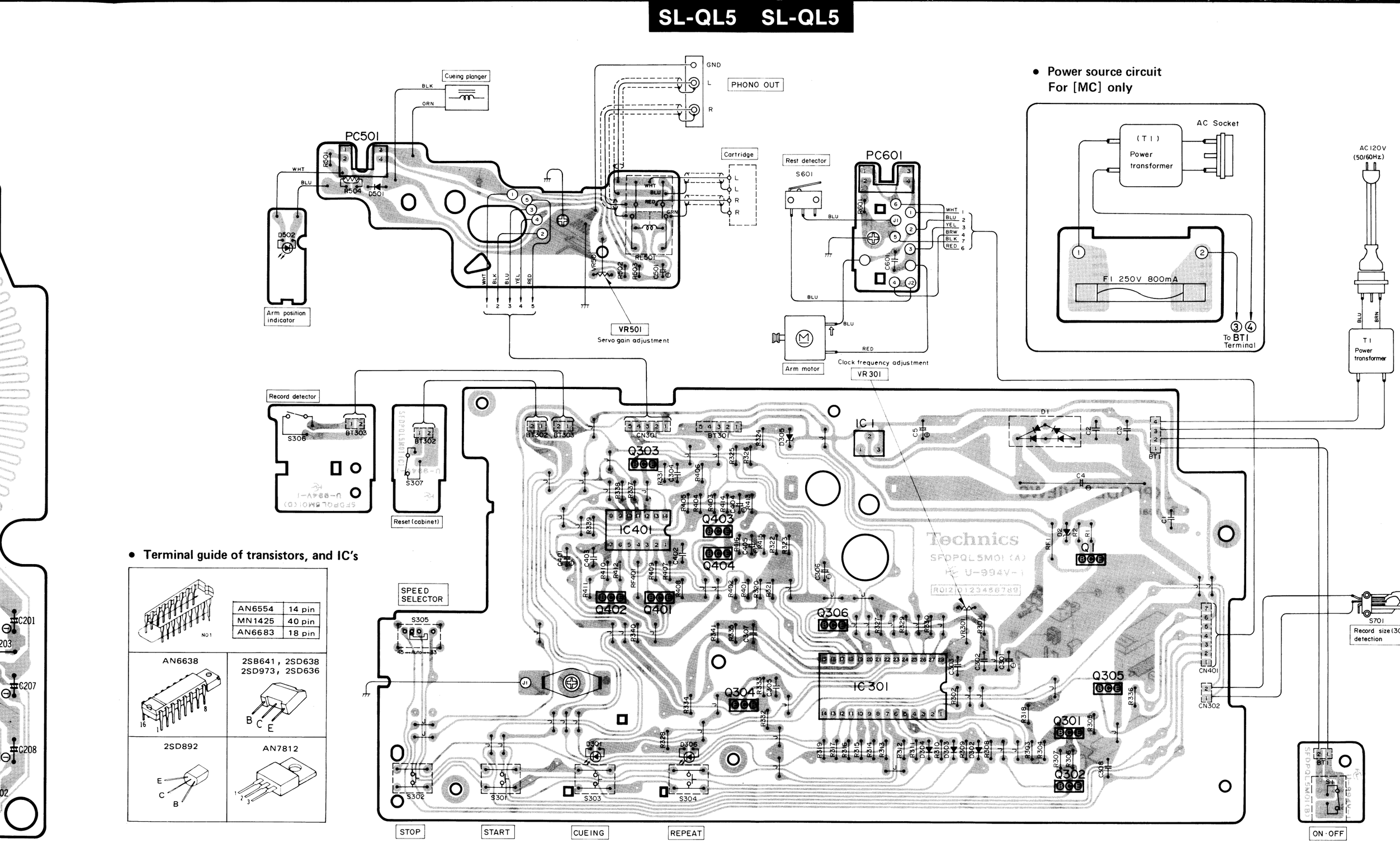
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM





- **Terminal guide of transistors, and IC's**





• **Terminal guide of transistors, and IC's**

■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

1. **S1** : On/off (power) switch.
2. **S301** : Start switch.
3. **S302** : Stop switch.
4. **S303** : Cueing control switch.
5. **S304** : Repeat switch.
6. **S305** : Speed selector switch in "**auto**" position.
7. **S306** : Record detector switch.
   (It is detects the record on the turntable.)
8. **S307** : Reset switch in "**on**" position.
   (Upper cabinet is closed.)
9. **S601** : Rest switch in "**off**" position.
   (Presently tonearm is on rest.)
10. **S701** : Record size detection switch.
11. The voltage value and waveform are the standard values of this measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Therefore, the voltage value and waveform may include some errors due to the internal impedance of the tester or the measuring set.
    * ⊓‾⊔ is the voltage when turntable is in stop.
    * ( ) is the voltage when turntable is in rotation.
    * ⌜ ⌟ is the voltage when tonearm is in lead-in mode.
    * < > is the voltage when tonearm is in return mode.
12. ——— Positive voltage lines.

*The part No. of diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement parts list.

IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

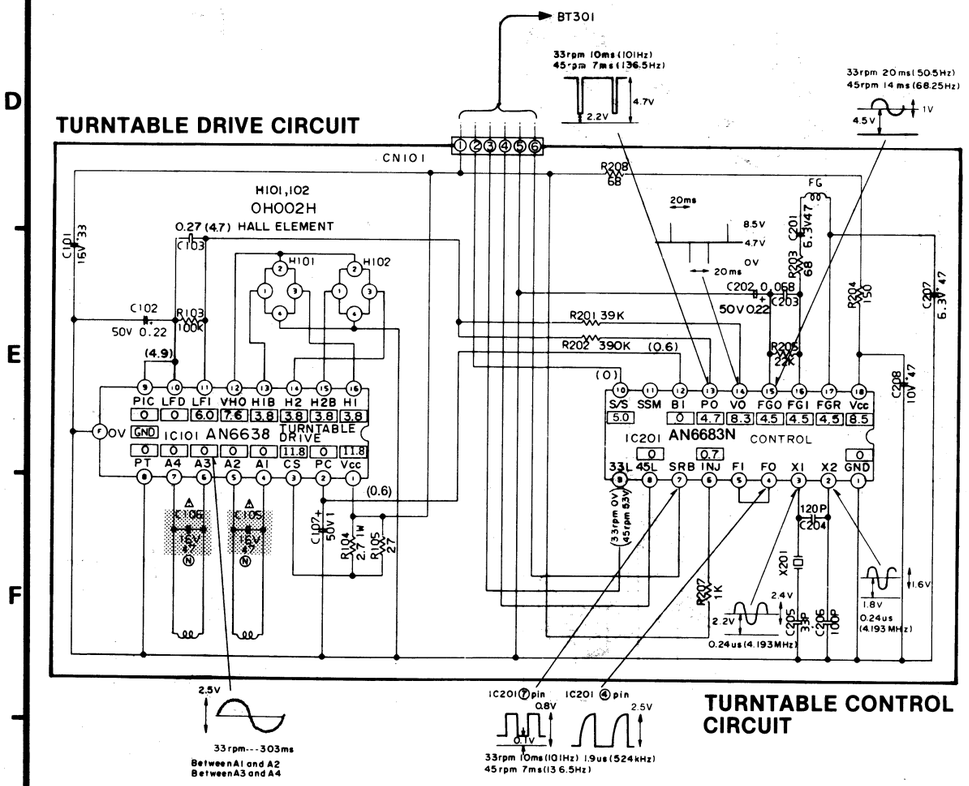
• Product for MC only

FUSE REPLACEMENT

⊟ Symbol located near the fuse indicates fast operating type. For continued protection against fire hazard, replace with same type fuse. Refer to the symbol for fuse rating.

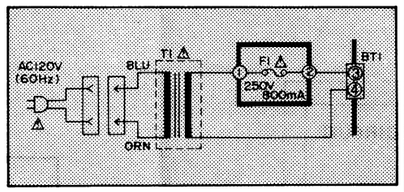
FUSIBLE REMPLACEMENT

⊟ Le symbole qui se trouve près du fusible singifie un fusible à action rapide. Pour une protection contiue contre les risques d'incendie, n'utiliser que des fusibles du même type. Se rapporter au symbole pour la valeur des fusibles.

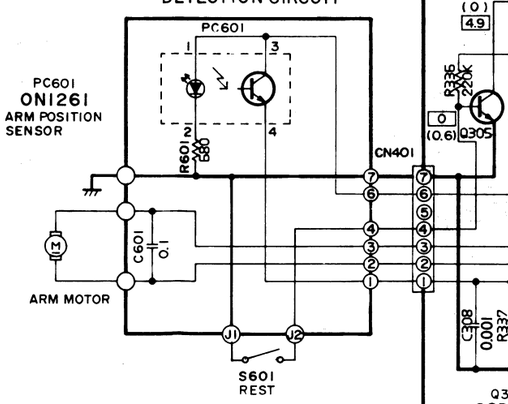


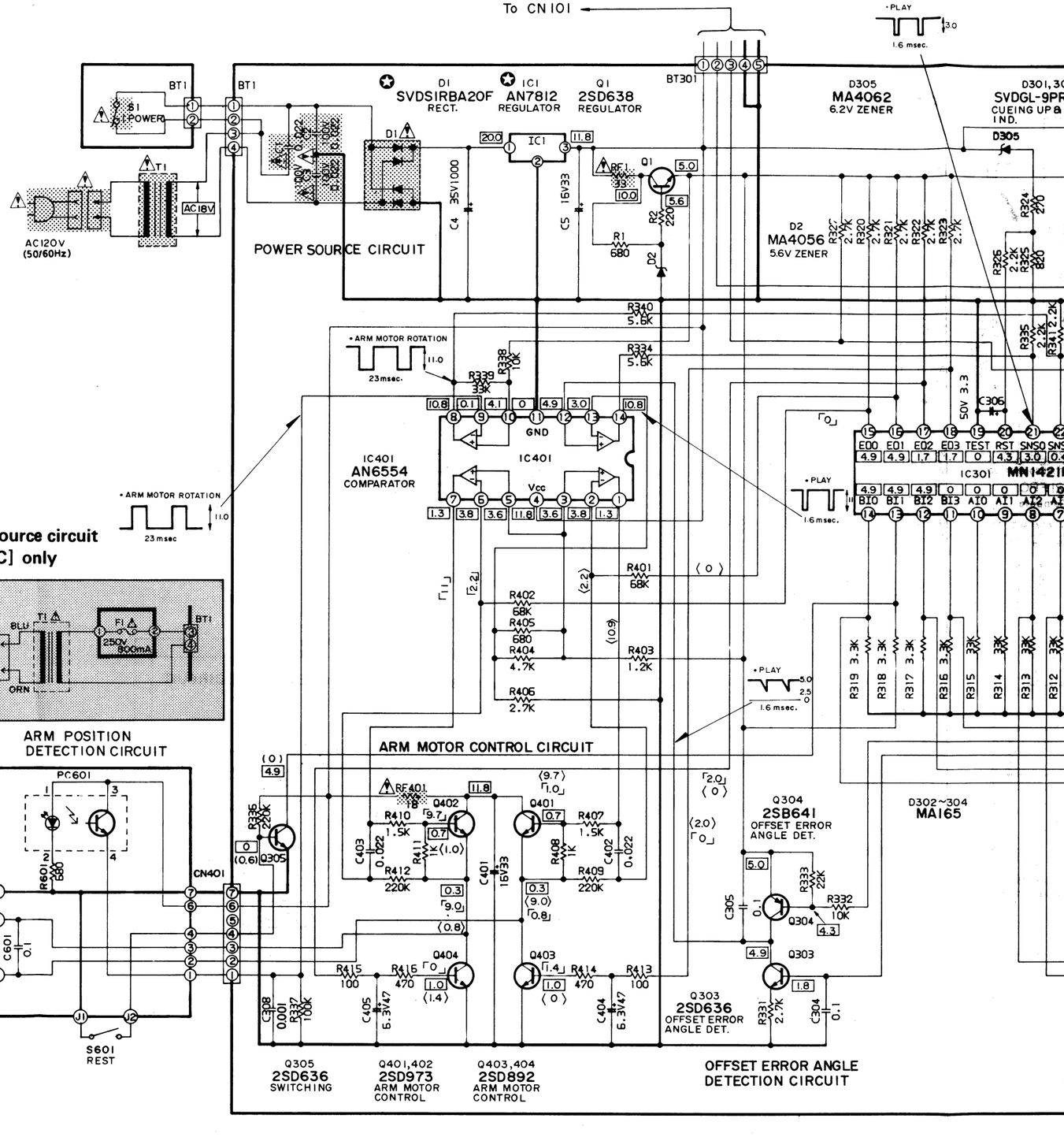
TURNTABLE CONTROL CIRCUIT

• Power source circuit For [MC] only



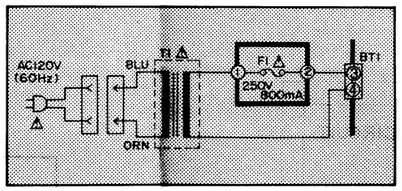
ARM POSITION DETECTION CIRCUIT



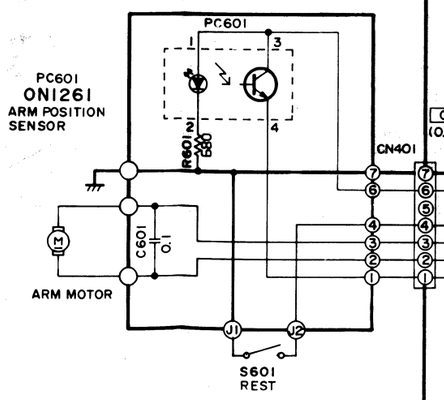


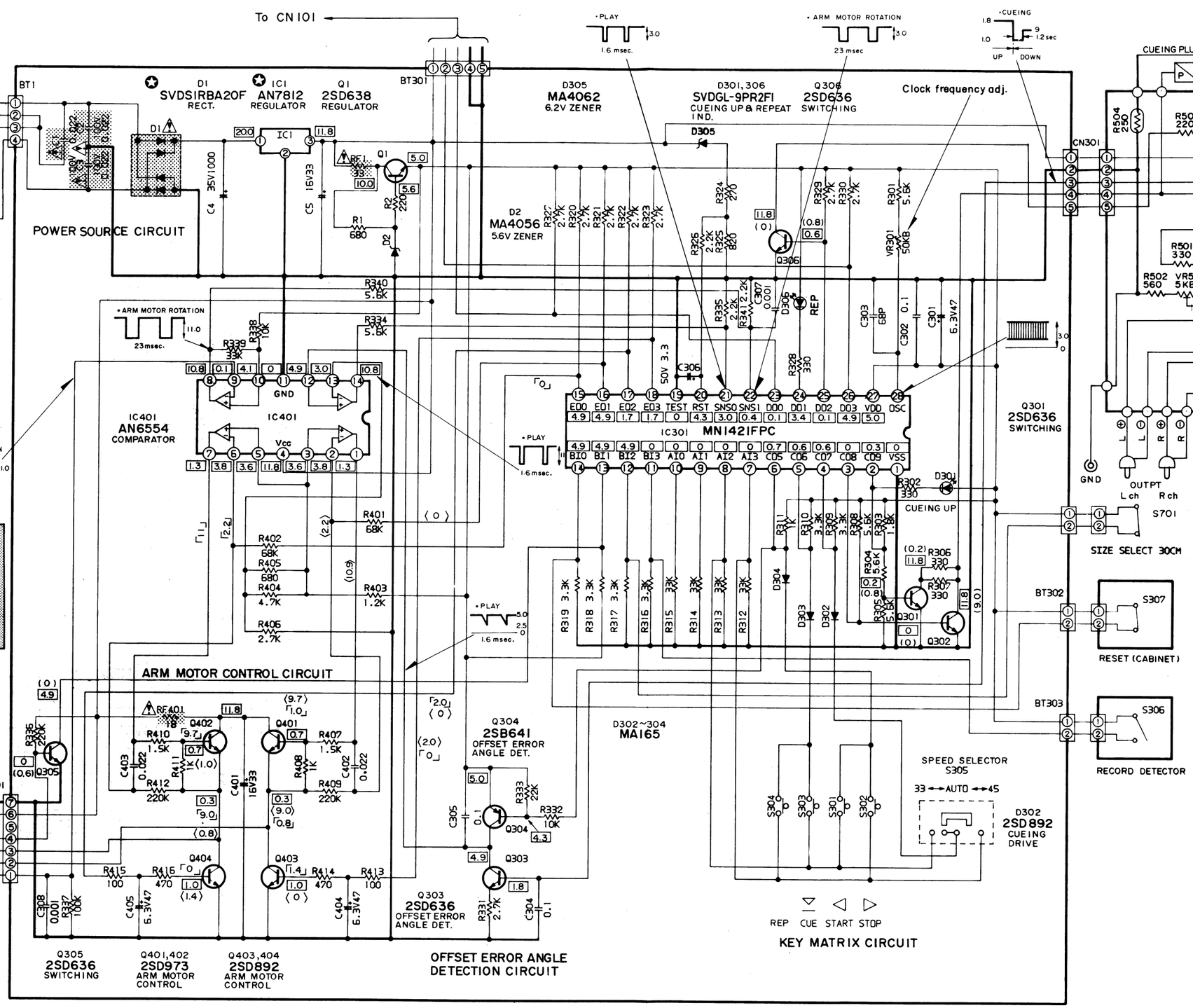
5 6 7 8 9 10 11 12 13 14

- **Power source circuit For [MC] only**

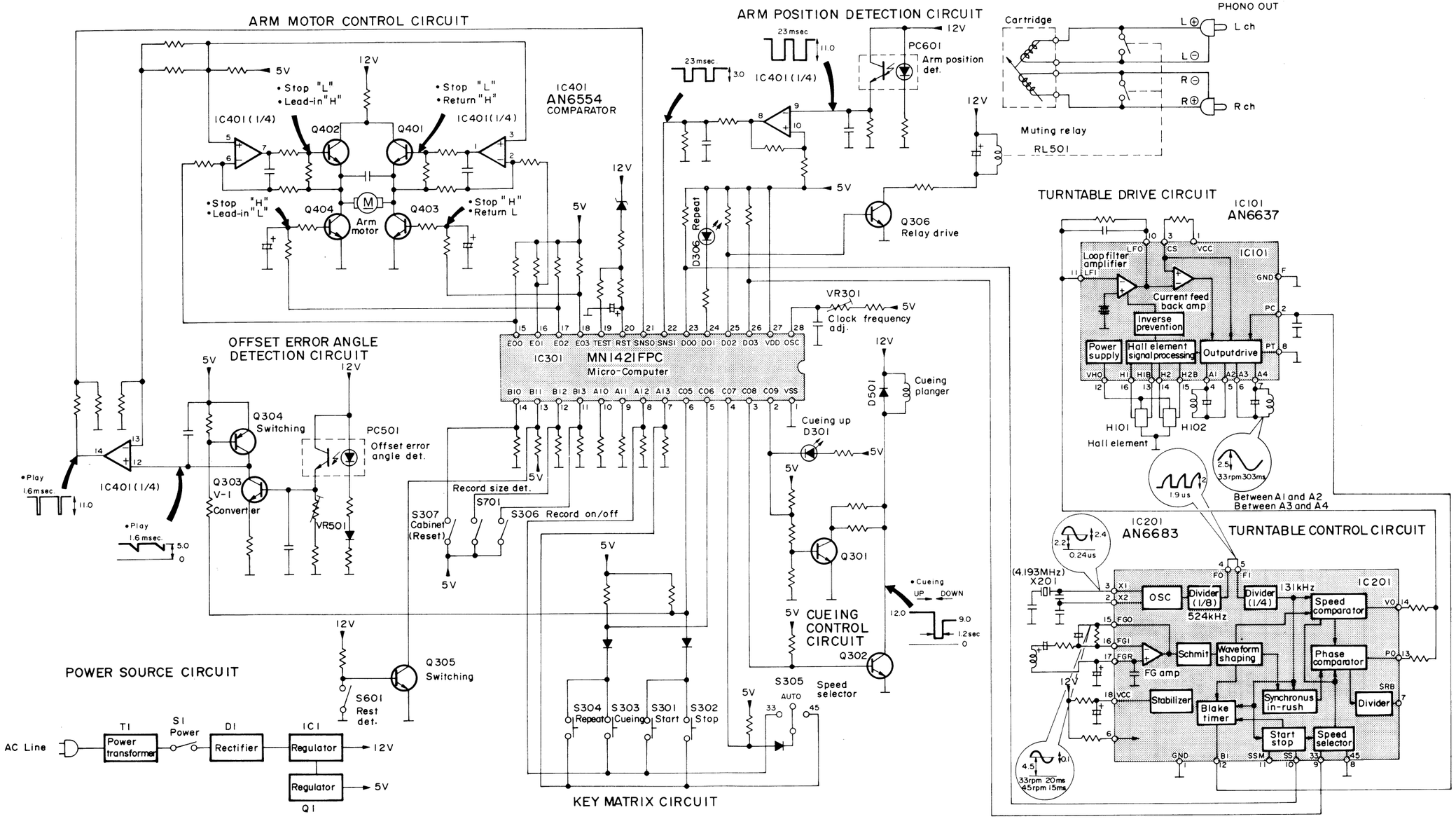


ARM POSITION DETECTION CIRCUIT

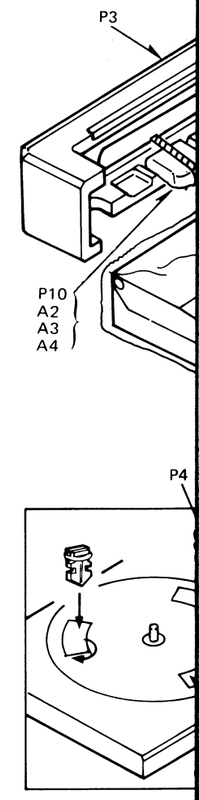


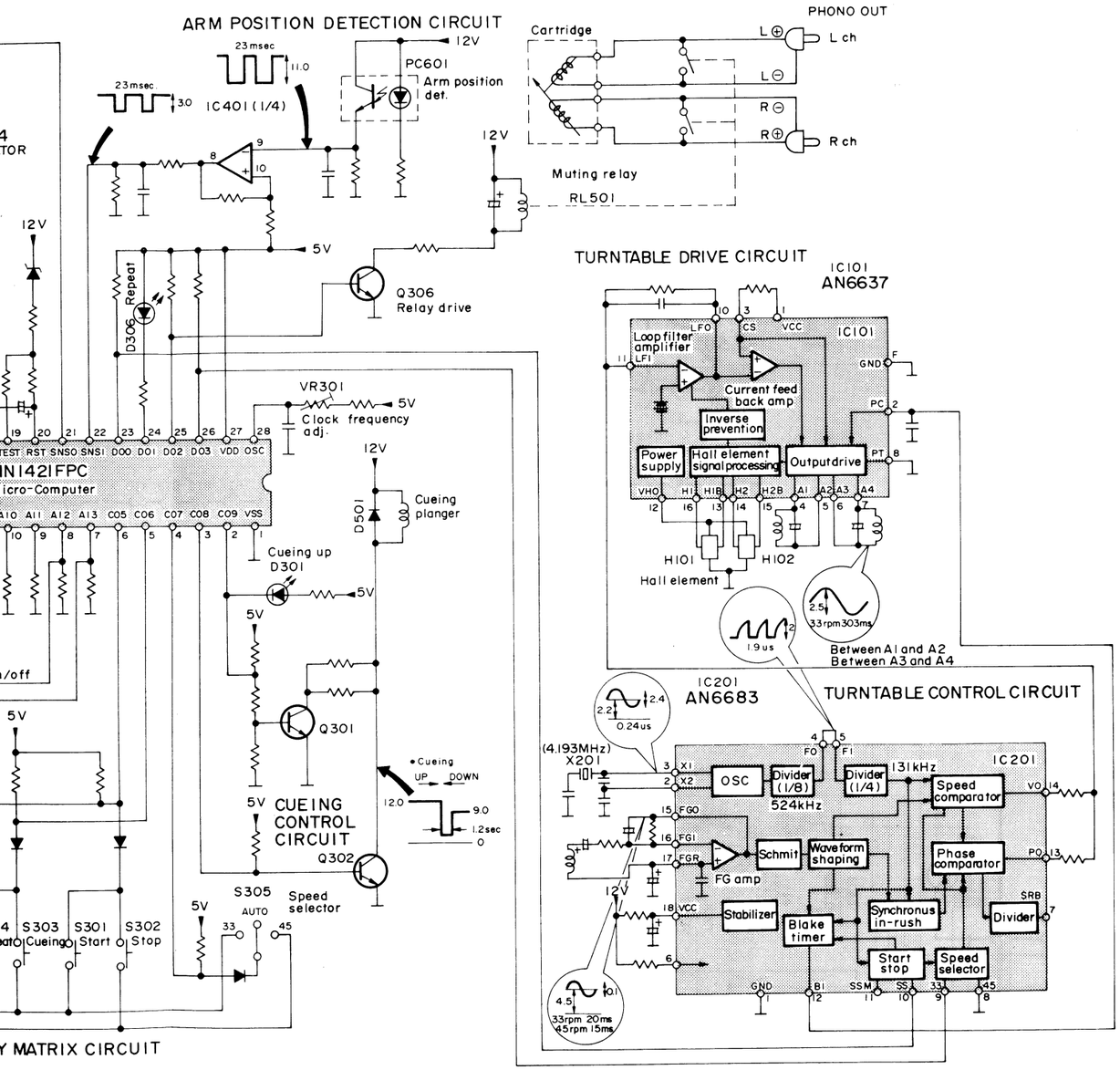


■ BLOCK DIAGRAM



■ PACKING





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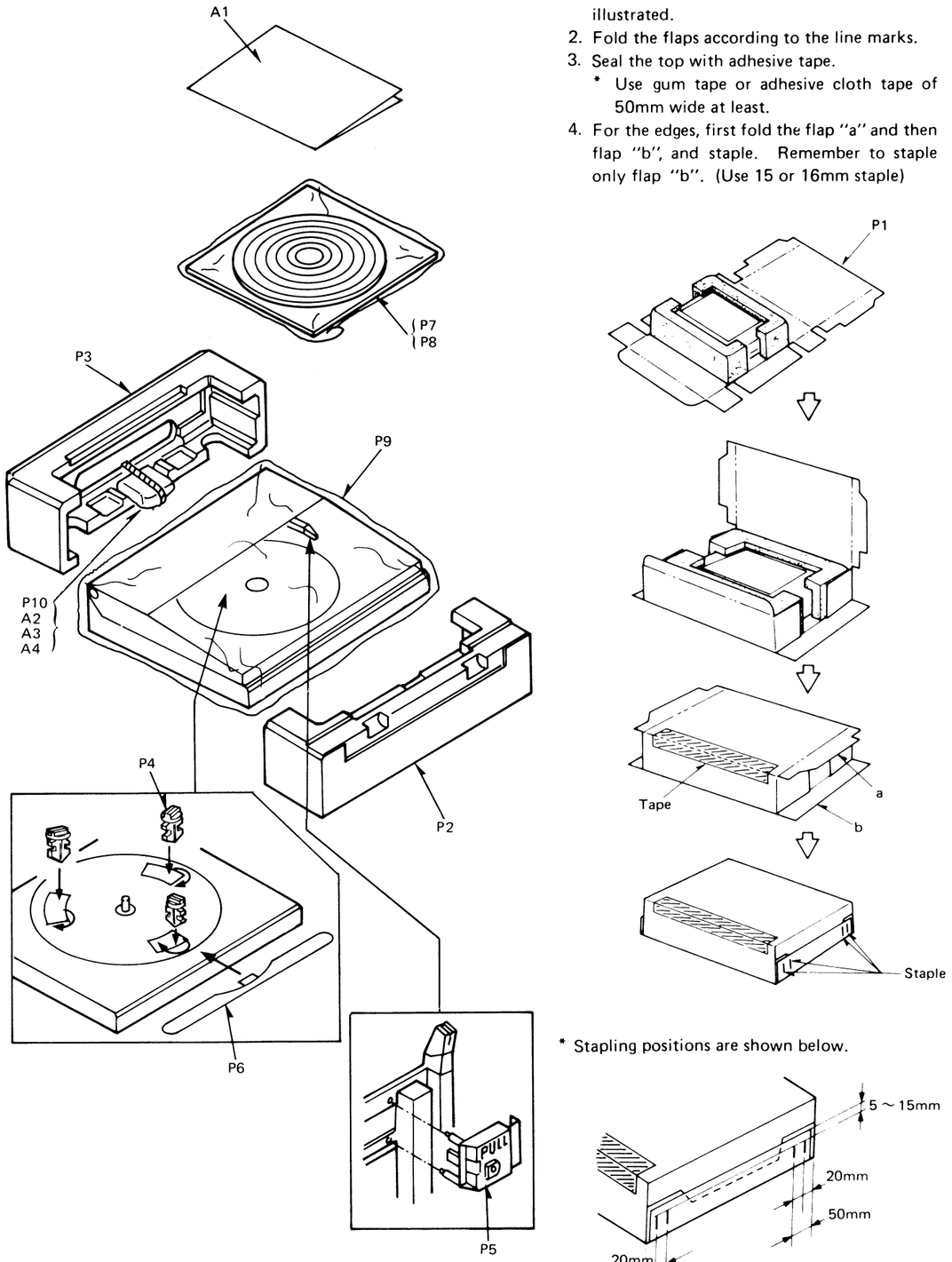
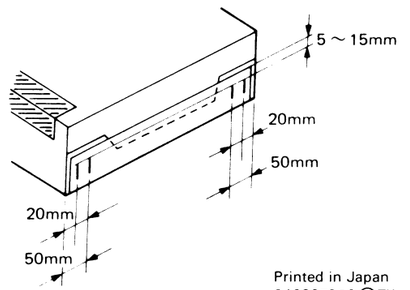


1. Plase the unit (with cushions attached) as illustrated.
2. Fold the flaps according to the line marks.
3. Seal the top with adhesive tape.
   * Use gum tape or adhesive cloth tape of 50mm wide at least.
4. For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b". (Use 15 or 16mm staple)

* Stapling positions are shown below.



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